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SEPTEMBER 1945

PUBLISHED MONTHLY BY AMERICAN MEDICAL ASSOCIATION, 535 NORTH DEARBORN STREET, CHICAGO 10, ILLINOIS. ANNUAL SUBSCRIPTION, $6.00

Entered as Second Class Matter Jan. 14, 1925, at the Postoffice at Chicago, Under the Act of Congress of March 3, 1879

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UME 42 SEPTEMBER 1945 NUMBER 3

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VOCATIONAL REHABILITATION FOR THE DEAF AND THE HARD OF HEARING

M. M. WALTER

HARRISBURG, PA.

Under federal and state laws the term "vocational rehabilitation" and the term "rehabilitation services" mean any procedures and services necessary to render a disabled person fit to engage in a remunerative civil occupation. In analysis of this definition there are three important elements to consider: 1. The disabled person. Any one who has a physical or a mental impairment which is an employment handicap in that it affects his ability to obtain or return to employment on an equal basis with normal persons is a disabled person.

2. The rehabilitation services. These include the aids necessary to prepare a disabled person for employment.

3. The remunerative occupation. Such an occupation is one in which the monetary return is commensurate with the work involved.

Therefore, it may be said that vocational rehabilitation is a public service provided under present state-federal control to aid disabled men and women to maintain the dignity of independence through productive work, by making a sound investment in the necessary means to prepare and place them in employment. The purpose of the program is threefold: to provide any preparatory rehabilitation service which may render the disabled persons fit to engage in remunerative occupations; to effect the placements of such persons in suitable employments, and to investigate and supervise such placements pending assurance that they are successful.

For the deaf and the hard of hearing the program includes the following services: First, early location of deaf and hard of hearing persons in need of rehabilitation to prevent the disintegrating effects of idleness and helplessness. It is in this stage of the process of rehabilitation that physicians can be helpful by immediately referring to their state rehabilitation agency persons with aural impairments who come to them for medical advice and who are unemployed and in need of assistance to enable them to obtain suitable work.

The second step involves a careful medical diagnosis and prognosis coupled with an adequate vocational diagnosis as a basis for determining an appropriate plan for the person with an aural impairment. Here again otologists can be of assistance in providing adequate medical examinations for determining the capacities and occupational limitations of persons with hearing defects and the services that will be required to take care of their needs.

At this point vocational counseling is provided to help the handicapped person select a suitable field of work, relating his occupational capacities to job requirements and community occupational opportunities. For the persons in need of medical and surgical treatment the otologist can render an invaluable service by affording physical restoration and medical advice as to the type of training to be given and as to the work tolerance of the subject. In addition to medical and surgical treatment, it is often necessary to fit the applicant with a hearing aid and provide speech correction and training in lip reading. For some persons, physical and occupational therapy and psychiatric treatment are essential.

Many disabled persons require vocational education and training to learn new skills, since their physical impairment has incapacitated them for their normal occupations or their skills have become obsolete owing to changing conditions. As a part of the training program, financial assistance may be required to provide maintenance and transportation.

On completion of his preparation, the applicant is assisted in securing employment in accordance with his physical condition, qualifications and temperament. Such placements are effected as will safeguard handicapped workers and assure proper utilization of their abilities and skills.

The last step is the follow-up to determine whether the handicapped worker was properly

Read at the meeting of the American Academy of Ophthalmology and Otolaryngology in Chicago, Oct. 8, 1944.

placed. Adjustments may be found necessary; a medical follow-up may be needed; a prosthetic appliance may require attention; the worker may need supplementary training, or he may need some special assistance in adjusting himself to working with others.

Vocational rehabilitation of handicapped persons had its inception in the occupational adjustment of the industrially disabled, those persons who are injured in industry. Back in 1919, in order to supplement Workmen's Compensation and make it possible for injured workmen to return to employment, twelve states passed what were then called industrial rehabilitation laws. In function these laws were primarily concerned with the placement of these persons in employment. They were mostly older persons who needed artificial appliances or readjusment to industry or both.

As a result of the experience in the rehabilitation of the disabled veterans of World War I, and because of the large number of persons who were injured in industry and through other causes, the federal government passed the National Civilian Vocational Rehabilitation Act of 1920. The program, instead of being limited to persons who became injured in industry, was extended to cover other groups, persons disabled as a result of disease, congenital causes or public accident. The service included guidance, training, the provision of prosthetic appliances and placement.

Studies made by the United States Public Health Service during the past five years indicate that there are many disabled persons in this country who need not only training and placement but physical restoration. According to these studies, there are 23,000,000 people in the United States who are physically or mentally disabled. Of this number, approximately 7,000,000 are either under 16 years of age or beyond 64. The other 16,000,000 are in the labor market, and at least 2,000,000 need some type of service during their lifetime in order to maintain their place in the economic world. Annually, about 800,000 new ones are added to the pool. Furthermore, of 8 disabled persons in need of vocational rehabilitation, at least 1 needs training, 3 need physical restoration and 4 require adjustment to a job. For these reasons when the National Civilian Vocational Rehabilitation Law of 1920 was amended by Congress last summer, there was included in addition to provision for prosthesis, provision for other forms of physical restoration.

To be eligible for physical restoration under the new program, the civilian's disability must be (1) handicapping as to employment, (2) static (relatively stable) and (3) remediable by treatment which is limited to ninety days hospitalization and to a "reasonable period" treatment as an ambulatory patient. The word "static" differentiates the program from one of general medical care for acute illnesses. Thus persons with long term chronic pathologic conditions are not eligible because the objective of treatment must be one which can be reached within a reasonable length of time.

Physical restoration includes medical diagnosis, medical, surgical and psychiatric treatment, hospitalization, medical social service, physical therapy, occupational therapy, bibliotherapy and fitting of prosthetic appliances—all the skills that are required for the physical or the mental restoration of the disabled.

Service to persons with abnormal mental conditions is also a new function. It requires careful study in order to determine those to whom the "door" is closed forever, those to whom it may be opened again so that they can return to normal life and take their places in society, those in whom the mental condition is temporary and those to whom it is simply a ruse.

For purposes of vocational rehabilitation, the deaf include those who were born either totally deaf or sufficiently deaf to prevent the establishment of speech and natural language, those who became deaf in childhood before language and speech were established and those who became deaf in childhood so soon after the natural establishment of speech and language that the ability to speak and understand speech and language has been practically lost to them. The hard of hearing are those who established speech and ability to understand speech and language and subsequently developed impairment of hearing. These persons are sound conscious and have a normal or almost normal attitude toward the world of sound in which they live.

The deaf may also be divided into those who have been taught to use spoken language and those who are mute, and the hard of hearing may be classified into the severely and the moderately hard of hearing. A loss of approximately 70 decibels may be considered the dividing line between the moderately and the severely hard of hearing. However, in determining this line of demarcation it is often necessary to consider other factors, such as use of a hearing aid and ability to read lips.

The preparation of the deaf and the hard of hearing for employment involves certain procedures and technics. The first step is to determine the mental, physical and emotional characteristics of the applicant, his experience and the environmental factors concerned with

problem. The mental characteristics help to ate the level of educability and indirectly t the level of employability. This is im- ant in the case of the aurally handicapped on because, as indicated in studies by Ru- h Pintner, of Teachers College, Columbia versity, and others, the deaf child is apt to educationally retarded about five years and tally inferior to the extent of two or three s. On the other hand, hard of hearing girls boys are usually equal to the normal hearing in native intelligence or in mechanical apti- s, but because of the nature of their disabili- they may be inferior in vocabulary and in the ery of academic subjects, particularly if the ing deficiency began during childhood or escence.

he mental qualities are determined through nalysis of the subject's previous accomplish- ts in school, especially schools for the deaf he hard of hearing, and tests, usually of the verbal type since deaf persons are always dicapped in language development and hard earing persons may be deficient in vocabulary educationally retarded. Since the aurally dicapped person may be deficient in auditory ty and auditory memory, it is necessary to rmine if possible other aptitudes and abilities stract, social and mechanical—such as visual ty, visual memory, visual imagery, muscular dination, muscular sensitivity and perception olors. The determination of these qualities aptitudes and their expression through active avior provide a means of arriving at the in- sts of the handicapped person, those motives drives which are the impelling forces that him toward certain specific goals.

he second phase of the survey is concerned n an analysis of the physical characteristics determine the nature, the extent, the effect the present physical condition of the appli- . A hearing loss of 30 decibels or more ally constitutes an employment handicap and cates eligibility for rehabilitation. This re- to the average loss of the speech range in the er ear. Of course, there are times when it ecessary to consider other factors, and for reason the average decibel loss indicated is not used too rigidly in determining eligi- y. For instance, if the applicant's personal vocational adjustment are satisfactory, he not have an employment handicap even gh he may have a severe hearing loss. On other hand, one with less than a 30 decibel may be considered for rehabilitation because prognosis indicates progression or because e is a speech defect which has developed as a result of a serious loss in hearing for the higher frequencies and in recognition of certain consonant sounds.

The physical characteristics are determined through a general physical examination followed by a special examination in the case of the hard of hearing person. The report of the otologist includes the history and the status of the disability, its effect on the client's physical and manual activities, the patient's experience with a hearing aid or his ability to read lips, the functional loss as determined through audiometric and nonaudiometric tests and the effect of the physical condition on the client's voice and on his auditory perception. Likewise, an adequate otologic diagnosis indicates the type of deafness, the pathologic alterations of the hearing mechanism, the primary and the contributory causes of the condition, the characteristics of the hearing condition, the prognosis and recommendations concerning future developments of the condition, the treatment recommended, including the prosthesis, precautions that should be taken in the training or the placement of the person in employment and the desirability of a medical check-up.

Although the personality problems of hard of hearing persons are not unique, they seem to be more pronounced among adults than among adolescents, and rehabilitation is apt to be of more benefit if the onset of the impairment occurred in maturity. It is not unusual for those who are aurally handicapped to feel that they have been stripped of their "readjusting power," often to the extent of being buried alive. Owing to visual expressions of strain and harsher qualities of the voice, they are apt to acquire a feeling of social inadequacy because of their failure to hear. They may apprehend the opposite of what is meant and acquire habits of inattention and irresponsibility, resulting in fatigue and exhaustion. With this state there may develop depressive tendencies, such as despondency, feelings of incalculable loss, hopelessness, sense of inferiority, introversion, supersensitiveness and fear. For some patients, emotional or personality problems may reach the stage of brooding and bitterness, suspicion carried even to their friends, anger and rage against fate and even delusions of persecution.

On the other hand, the handicapped person may ignore the existence of the condition, pretending to understand what is said, fooling others and trying to keep going as usual, or he may withdraw from the world to his own shell and yield to isolation and depression, or he may accept the limitations, face the facts of his situa-

tion and do everything in his power to live a life as nearly normal as possible. As will be indicated a little later, lip reading is recognized as of unusually great psychologic value in removing a false sense of shame for the sensory defects and in centering attention on achievement.

Successful rehabilitation requires a clear understanding of the emotional disturbances, if they exist, in order that provision can be made to overcome the deficiencies through adequate guidance, counseling and, if necessary, treatment. In order to overcome or to counteract these tendencies, clients are encouraged to associate normally with hearing persons and to build up self confidence through successful achievement. Frequently, a mere understanding of the problems arising from a hearing handicap is sufficient to permit a healthier outlook and a more active effort to carry on normally.

In addition to an analysis of the mental, physical and emotional characteristics, it is necessary to secure some data on the environmental factors which often have an important bearing on rehabilitation. They include the client's family, his social and economic status, the employment opportunities in the community, the facilities available to prepare him for employment and the agencies in the community in a position to cooperate in order to provide a well rounded program.

The determination of a suitable job objective is the next step in the procedure. It grows out of an evaluation of the elements found in the survey together with adequate guidance and counseling to assist the applicant to solve his problem. With certain important exceptions, vocational guidance for deaf or hard of hearing persons in its relation to selection of suitable jobs is not different from that for persons with other disabilities. Among the special considerations are: (*a*) the selection of a suitable job in terms of the degree to which speech and hearing are required for success, (*b*) the selection of an occupation at which the client can work without danger of injuring his remaining hearing and (*c*) the client's capacity for adaptation.

Mechanical occupations are usually emphasized for deaf persons. It is important to know whether they were taught by the oral or the manual method, what trades they learned and their proficiency, and how much time was devoted to lip reading and the cultivation of speech. Jobs which require too much oral communication are avoided. If the persons are hard of hearing, it is important to know whether they can read lips or wear a hearing aid and what their attitude toward the value of the latter is. Employment in damp, dusty and noisy environments and in high places is avoided if the nature of the disa so indicates. Occupations are considered w are not occupational hazards. The capacity adaptation is an important factor, especially a person with previous experience who may quire adjustment to a new occupation. Th especially true for those who are employed because of progression of the disability m change positions, as in the case of a stenogra who can no longer continue in this occupa but could be adjusted to a related field, such bookkeeping.

Because of the nature of the disability, success of this phase of the service depends the ability of the counselor to establish rap with the hard of hearing client. Counselors urged when interviewing the client to sit or st in such a position and talk in such a manner to make it easy for the latter to read the lips. order to facilitate the client's ability to read the interviewer faces the light, looks at the cli speaks slowly and enunciates clearly.

Following the determination of the job obj tive, the next step is to prepare the handicap person for employment. This may involve m cal and surgical treatment to afford phys restoration, provision of a hearing aid, train in lip reading or speech correction and m certain conditions physical and occupatio therapy and psychiatric treatments. Especia apropos of the situation of the hard of hear person is the rehabilitation adage: "Never t around a handicap if it can be removed, redu or improved."

The conditions under which medical treatm operation and hospitalization may be provi were outlined on an earlier page. Since thi a new service it is not possible at this time enumerate the disabilities of aurally handicap persons which may make them eligible for phy cal restoration. As type cases are found medical advisory committees of the states to within the classifications set forth in the "Man of Policies" issued by the Federal Rehabilita Office, medical treatment, operation and h pitalization will be provided. On the other ha the states have had considerable experience providing hearing aids, training in lip reading speech correction.

Hearing aids render many hard of hear persons more employable. The function of th prostheses is to reduce the severity of the han cap. On the basis of an experiment conducted Pennsylvania over a period of two years a studies made in other states, the following gui posts were found to be helpful in determining need for an aid.

The pattern of the client's hearing loss in- s to some extent the probable usefulness instrument. Generally speaking, a hearing used most successfully by a person with ximately the same degree of loss at the us frequencies throughout the speech range. habilitation circles the speech range is be- 256 and 2,896 cycles. An even amplifica- therefore, is a favorable factor. This is to the fact that manufacturers have been successful in the production of aids with amplification than in that of aids with ive amplification.

The best results may be expected when the ge loss is from 40 to 70 decibels. An aid be provided for a person with a loss of 45 decibels if there is reason for believing ill wear it frequently enough to justify the For a person with an average loss of 70 decibels, the question is whether he will nough benefit out of it to justify the cost.

For the person who has never worn an aid, y be helpful if the impairment has developed cently that the ability to interpret amplified h has not been lost.

The prognosis of the future course of the irment is important. Although the advisa- of recommending hearing aids for persons progressive deafness is often questioned, it be considered because (*a*) the hearing loss not be as progressive as the report of the gist indicates, (*b*) recent improvements in ing aids have increased the usefulness of uments for those with serious defects and to some extent the instrument can be ad- d to the changes in the client's hearing.

The age of the client is an important factor e selection of a hearing aid. A young person lly adjusts to a hearing aid more rapidly an older one.

In an occupation which requires conversa- with others an aid may be furnished earlier in one in which conversation is not required.

The client who has not been able to adjust elf emotionally to his handicap is apt to use id less successfully than one who is adjusted. is especially true of the shy, retiring person has difficulty in adjusting to amplified and orted sounds. This is also true of the client is too nervous, unless this is due to fatigue ear of losing his remaining hearing.

In every case the client is urged to accept id which he can wear with comfort and h will bring in all sounds necessary for ng intelligibility to speech.

As a protection to the client and also as another guard in determining the feasibility of fur- nishing a hearing aid, a check list is used with twelve factors to be considered: the physical and emotional condition of the client; the improvement effected by the use of the aid; the ability to interpret speech and read lips; the client's past experience in the use of an aid; the feasibility of an instrument as an aid in training or employment; the otologist's and the client's reaction to the use of an aid; the availability of facilities for repairing the aid in the community in which the client lives; ability to pay for maintenance, repair and service of the instrument, and the evaluation of the aid by the Council on Physical Therapy of the American Medical Association.

In any program of social and vocational adjustment of persons with hearing impairments, training in lip reading is one of the most important services that can be rendered. It is suitable for persons with all degrees of impairment, from those with slight loss to those who are totally deafened. Lip reading is given to persons with a tendency toward visual acuity which enables them to train the eyes for accuracy and quickness of perception while training the mind to understand by context those words which cannot be recognized by the movement of the mouth. In such persons the level of the vocabulary and the extent of the general knowledge are more important than general intelligence and analytic ability.

The course of instruction usually covers about forty lessons, and the training is given before hearing aids are provided. In a study of 50 persons who were given this service in Pennsylvania, it was found that 60 per cent were hard of hearing and the rest deaf and that in a majority of them the hearing impairment was the result of disease. More than 50 per cent were under 30 years of age, were single and had at least a high school education. For 50 per cent of the trainees vocational training in addition to lip reading was provided, and for 4 of them hearing aids were purchased. Objectives for which they were prepared covered some thirty different job fields, including personnel work, skilled trades, engineering, scientific research, dressmaking and designing, millinery and commercial work.

There are times when hearing aids and lip reading do not meet the complete needs of the client. Then it may be necessary to provide other services, such as speech correction. The purpose of this program is to improve or correct errors of speech due to defective volume, incorrect pronunciation of words and poor voice quality. The success of this service depends on an understanding of the defects by both the instructor and the client and how they affect the

latter's speech and his ability to use an aid to hear words that are correctly pronounced.

Vocational training for the deaf and the hard of hearing is an important service, and in some respects it calls for procedures different from those required for persons with other disabilities. It has been found from studies that deaf boys are often superior to hearing boys in all motor activities except those involving a sense of balance. On the other hand, deaf girls are apt to be inferior to hearing girls in motor abilities. For these reasons, as already indicated, mechanical occupations are usually emphasized in providing programs of training for deaf boys.

Inasmuch as training depends on the objective, it may be important in selecting an employment field to consider the extent to which normal hearing is required by the institutional method of training. College training is rarely feasible for the deaf or the hard of hearing who are so severely handicapped that they must rely entirely on lip reading for understanding speech. Therefore, careful guidance is necessary in the selection of aurally handicapped persons for college. The same situation applies for persons who are to be prepared for employment or training in technical or semiprofessional courses, such as architectural drawing, commercial art, dental mechanics, etc. With satisfactory training, however, the hard of hearing person can perform any of these jobs satisfactorily. This is especially true if he is trained in an institution in which the demonstration method is used extensively. As the hearing loss becomes more severe, training by employment methods becomes increasingly important, especially for deaf persons who have received their foundation training at a state school for the deaf.

Some activities in the clerical field are suitable to hard of hearing clients, especially women and persons with slight or moderate losses who have intelligible speech. Possibly two thirds or three fourths of all deaf and hard of hearing applicants for rehabilitation should be trained for various kinds of skilled or semiskilled work. In this field there is a wide group of occupations which are especially appropriate for men, and women can be trained as power machine operators for employment in factories. On the other hand, approximately 20 per cent of employed deaf and hard of hearing women are prepared for occupations in domestic service.

A few deaf and hard of hearing clients are prepared each year for work as farm laborers; others find jobs in greenhouses and nurseries. Truck farming, animal husbandry and other specialized types of agricultural work offer opportunities. Few rehabilitated clients have been placed in forestry work, though this occ ranks seventh among those reported by de hard of hearing men.

The best results are obtained when the ing is closely supervised. This service pecially needed to discover defects and to misunderstandings growing out of sus discouragement and sensitiveness to criticis cause of inability to understand the spoken The actual progress of the deaf or hard of h person may be difficult to appraise, especi he has the tendency to cover up a failure to stand. For this reason observation progress in learning the skills necessary fo gaging in a selective occupation is an impo element of supervision.

The deaf and the hard of hearing prese exception to the rule that rehabilitated should be recommended for placement beca their abilities rather than because they meri sideration in view of their handicaps. The numerous opportunities lie in private indus and probably with employers of small nu of workers rather than with large corpora It has been found from experience that be sults are obtained when special arrangement provided for the placement of handicapped sons, i. e., special agents are employed wh capable of rendering a complete rehabilita service in each case. This procedure is follo in Pennsylvania.

An adequate follow-up after placement i indispensable part of any organized place service for the deaf and the hard of hearing is especially important because of the possibi of friction or antagonism resulting from a la understanding. Moreover, through this se it may be possible to discover a need for fur training to prepare the employee more fully the specific job he has obtained.

The economic and social value of the e program is evidenced by the follow-up stu that have been made after placement. In own state over a period of years it has been fo that 85 per cent of the disabled persons who placed in employment each year were still w ing for the same employers a year later, appro mately the same number were engaged in occupations for which they were prepared. between 40 and 50 per cent had received increa in wages. Furthermore, they have proved cient and stable workers. Their productivity many instances has been higher than that of mal persons, and their absenteeism due to dent, illness and other causes has been less t that of their fellow workers. Instead of becom wards of the state, they have taken their pl in the economic and social life of the comm

ch they live and have become independent
lf-supporting citizens. Through vocational
litation it has been possible for them to
in the dignity of independence through
yment in productive work.

ween 1,500,000 and 2,000,000 persons, or
cent of the total population of this country,
ural impairments; i. e., 13 persons (1 deaf
2 hard of hearing) in every 1,000 persons
e population are aurally handicapped.
approximately 12,000 young men and
n each year enter the occupational world
apped by moderate or severe hearing im-
ents. This figure does not include the
number of older persons who become hard
aring during their later working years.
n per cent of the persons on the rolls of
tate rehabilitation services are deaf or
of hearing. Last year about 10 per cent,
00, of the persons rehabilitated by the
had aural handicaps, and because of the
provisions contained in Public Law 113,
d by Congress last year, the nation can look
rd to considerable expansion of this field of
n engineering.

e provisions for physical restoration con-
in the new State Plan provide an oppor-
for the otolaryngologic society and its
ers to play an important part in the develop-
of this phase of the program for the aurally
capped. Already some of the members of
medical profession are beginning to give
s thought to this problem. Under the di-
n of Dr. James E. Landis, of Reading, Pa., a rehabilitation clinic for the aurally handicapped was established in that city recently. Its aim is to rehabilitate to the greatest degree adults or children with aural handicaps, so that each may become able to lead as normal a life as possible.

Set up in the outpatient department of the Reading Hospital and comprising a staff of six and an associates' group of five, with Dr. Landis as director, the clinic includes among its services medical diagnosis and medical and surgical treatment. If the loss of hearing shows a tendency to increase or is permanent, the clinic tries to rehabilitate the patient so that better social relations may be established, an employment better suited to the condition may be obtained and a readjustment to a new and more effective way of living may be created. The vocational adjustment of the patient is provided through guidance, psychologic and other tests, a hearing aid, training in lip reading, training for employment and placement.

The high purpose motivating the establishment of the clinic is indicated in its motto, which is also the controlling purpose of vocational rehabilitation. "Any deaf or hard of hearing person may represent a phenomenal surgical or medical success, but if he is not equipped to fit readily into the pattern of his civilian life he will represent a failure so far as vocational rehabilitation is concerned."

It may truly be said of vocational rehabilitation that it conserves the greatest of all assets, the working usefulness of human beings.

EFFECTS OF GUN BLASTS ON HEARING

COLONEL WILLARD MACHLE
MEDICAL CORPS, ARMY OF THE UNITED STATES

HISTORICAL REVIEW

For about one hundred years,[1] the effects of gun blasts on hearing have been recognized and have stimulated numerous searches for practical means of protection.[2] Recently, many reports dealing with the effects of repeated exposures have contributed a considerable amount of information regarding the characteristics of the loss of hearing which follows acoustic trauma from blast intensities less than those required to rupture the ear drum.[3] Nevertheless, knowledge concerning factors which may determine sensitivity of the ear to blast waves or alter the theoretic relationship between magnitude of exposure and acoustic effect is still incomplete. Long intervals often occurred between exposure and the characterization of the loss of hearing, so that the cause of the latter was not always established with reasonable likelihood [4] nor were the limits of potential recovery defined.

PURPOSE OF PRESENT STUDY

This preliminary study was undertaken (1) to explore under controlled conditions the characteristics of the hearing loss following exposure to gun blast, (2) to determine the degree of recovery from single and from multiple exp and (3) to investigate the relations magnitude of exposure, measured by int of blast pressure, to ensuing hearing loss.

PROCEDURE

An initial survey of 45 gunnery instructors was out to establish the characteristics of the hear that had occurred in armored personnel frequen posed to blasts of 37 and 75 mm. guns. Most men had been exposed to approximately 100 round 37 or 75 mm. guns daily over a period of six o hours for six consecutive days, were then fre gunnery exposure for one or two weeks, and after experienced repeated sequences of exposu few had been exposed to the blasts of 105 mm. h and small caliber guns in addition. The shortes all period of exposure in this group was two m and the maximum was thirty months, the mean nine and seven-tenths months. Eighty per cent men used improvised ear plugs of cotton, waste patches; 20 per cent used these expedients rarely at all. Audiometric examinations were carried a minimum of one hour after the last exposure—i instances weeks or months elapsed. The ages men ranged from 19 to 36 years, the mean age 25.6 years. No significant history of aural dise previous exposure to occupational noise was elicite

Experimental studies under controlled condition carried out on 12 subjects. Repeated audiometri were made over a period of four days prior to exp The results were found to be within the mar error, and a base line was thus established. The ear was then used as the test ear. During ex the control ear was protected by a soft rubber carefully fitted into the canal and a sponge rubb covering the external ear, over all of which a cloth helmet was firmly held by a rubber band. men were exposed to gun blasts as follows: 8 t of the 75 mm. gun, 3 to that of the 37 mm. gun to that of the .30 caliber machine gun. They placed at measured distances at right angles t barrel of the gun at the level of the muzzle; the 75 and 37 mm. guns, the subjects were at a dis of 8 feet (2.4 meters); with the .30 caliber m gun, at a distance of 6 feet (about 2 meters). exposures ranged from one to eight.

Audiometric examinations were begun within minutes after exposure and were repeated at int of two, four and twenty-four hours, with the tw four hour pattern being used as the base line fo next exposure record. At the conclusion of the all period of exposure, recovery was observed by m of daily audiograms. The instrument used wa Maico audiometer (calibrated by means of an Beat Frequency Oscillator), a General Radio S Analyzer 760 A and a General Radio Sound L Meter 759 B. Examinations were carried out yards (914 meters) from the firing point in an ins

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Read at the meeting of the American Academy of Ophthalmology and Otolaryngology in Chicago on Oct. 8, 1944.

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2. Guild, S. R.: Tests upon Devices for the Prevention of War Deafness, Anat. Rec. **14**:36, 1918. Trible, G. B., and Watkins, S. S.: Ear Protection, U. S. Nav. M. Bull. **13**:48, 1919. Ireland, M. W.: The Medical Department of the United States Army in the World War: Surgery, Washington, D. C., Government Printing Office, 1927, vol. 11, pt. 2, p. 778.

3. Because of limited library facilities, no attempt has been made to provide a systematic and complete bibliography. Several of the papers cited, especially that by Bunch, carry extensive references.

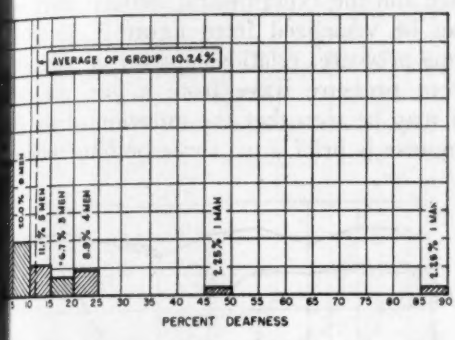
4. Rüedi, L.: Das akustische Trauma im Aktivdienst, Schweiz. med. Wchnschr. **71**:512, 1941.

ce with ambient sound levels ranging from 22 ecibels.

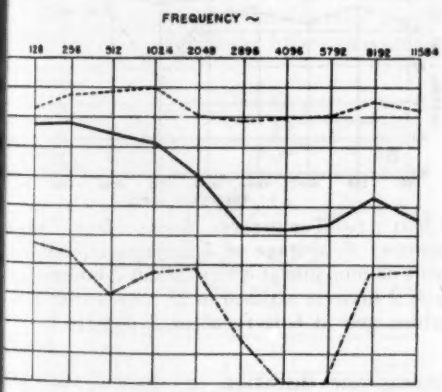
pressures were measured in terms of positive only. The pickup used was a Baldwin Loco- Type 4, Strain Gage cemented to the back of a iaphragm. Recordings were made on a Brush Inking Oscillograph, calibrated by fitting an air- ontainer over the face of the pickup and using measured pressure for deflection measurements.

RESULTS

magnitude of hearing loss in gunnery tors may be observed from figure 1, in



t 1.—Percentage loss of useful hearing in a group gunnery instructors. Calculations of loss were y the tentative method of the Council on Physical y of the American Medical Association.[5]



t 2.—Mean audiometric curve of 45 gunnery in- rs (solid line) and extreme variations from the (upper broken line, average for 3 men; lower, e for 4 men).

the frequency distribution of the sample n is given on the basis of percentage loss of hearing. Calculations were made by the ive method of the Council on Physical py of the American Medical Association.[5] average loss is not great, but some men t significant impairment and sustain marked in certain frequencies, as may be seen in figure 2. The mean audiometric curve was obtained by plotting the means of the records on all men at each frequency. One point of interest emerges from inspection of this curve, viz., the points of maximum depression are distributed equally among three frequencies, 2896, 4096 and 5792. This is true for the men who exhibited the smallest losses and for those with the most severe losses. The range of variance in the group may be inferred from the two other composite audiometric curves, one for the men least affected, the other for those most affected. There was no correlation in this group between either age or duration of work as instructor and degree of loss of hearing. Neither did any contingency exist between use of cotton or other protector and degree of loss. One man among the 3 having the smallest losses used no protection. He had been exposed to blasts from .30 caliber, .50 caliber, 37 mm., 75 mm. and 105 mm. guns for seven months. Conversely, 1 of the 4 with the most severe losses had been an instructor for only four months and always used cotton or gun patches. This failure of correlation may be explained partially by differences in individual subjects, but more probably results from variables in exposure. It would appear that the loss resembles that reported elsewhere, and one may assume, considering the ages and histories of the men, that it resulted from exposure to gun blast.

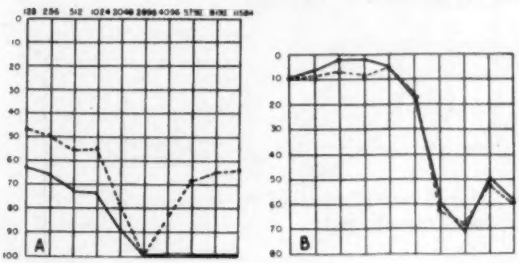


Chart 3.—*A*, hearing curves of J. J. D., aged 19, a singer, who was exposed to 96 rounds a day from a 75 mm. gun for eleven months. Impairment of hearing and constant tinnitus occurred in four months. On Jan. 31, 1944 he had an 88 per cent loss of hearing (solid line). He was last exposed in June 1944. On September 25 his loss had decreased to 70 per cent (broken line). Hence, without further exposure, improvement occurred within three months.

B, hearing curves of S. H. M., aged 25, who was exposed to 96 rounds a day from a 75 mm. gun for eight months. The solid line represents his hearing on Feb. 4, 1944. He was last exposed in June 1944. The broken line represents his hearing three months later, on September 23. In this case there was no improvement in hearing on cessation of exposure. There was no tinnitus after two weeks.

On Sept. 23 and 25, 1944, 14 of the original group of gunnery instructors were reexamined.

Tentative Standard Procedure for Evaluating the ntage of Useful Hearing Loss, report of the Coun- Physical Therapy, J. A. M. A. **119**:1108 (Aug. 1)

Ten of these had undergone no exposure to gunnery since June or July 1944; 4 were continuing work as instructors. Among those with no exposure for the past three or four months, only 2 showed some improvement in the audiograms; 8 exhibited no significant change. Typical examples of behavior may be seen in figure 3. One man (J. J. D.) regained about 18 per cent useful hearing in four months; the other

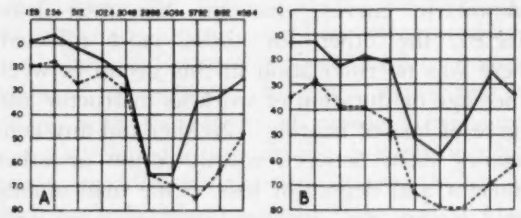


Chart 4.—Audiograms of the two ears of J. S., aged 22, who was exposed to 96 rounds a day from a 75 mm. gun for three years. The solid lines represent audiometric tests made on Feb. 2, 1944; the broken lines, tests made on Sept. 25, 1944. In this patient a 12 per cent loss increased on continued exposure to a 28 per cent loss. *A*, left ear; *B*, right ear.

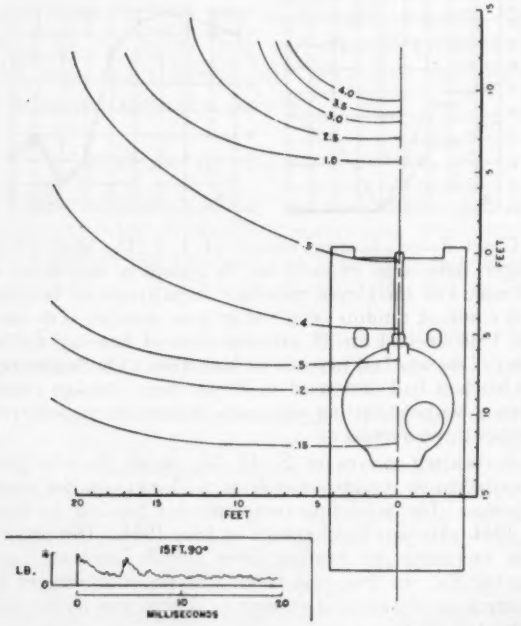


Chart 5.—Approximate contour lines of positive pressure following a blast from a 75 mm. gun measured at 5 feet 6 inches (about 1.5 meters) above grade. See text for further explanation.

(S. H. M.) showed no improvement. Since both men received their initial examinations (February 1944) within an hour after exposure, this difference in behavior was not attributable to differences in initial reaction to trauma and recovery therefrom. In view of the small number of men concerned one may not draw any inferences from the observations on these 2 men as to late or continuing recovery. No audi were recorded for men with evidence of r tory infection; it is possible in the cases 2 men, however, that subclinical infectio present at the time of the first examinatio of the 4 men who continued work as instr became worse to various degrees as a res the additional seven months of exposure. A grams of the man showing the worst dete tion are given in figure 4. His loss incr from 12 to 28 per cent in the seven month p

The nature of the pressure wave to which men and the experimental subjects were ex can be visualized from figure 5, in whic time-pressure relationships of a typical front pressure wave from a gun are out It may be seen that the duration of the p impulse is brief, i. e., three or four millise

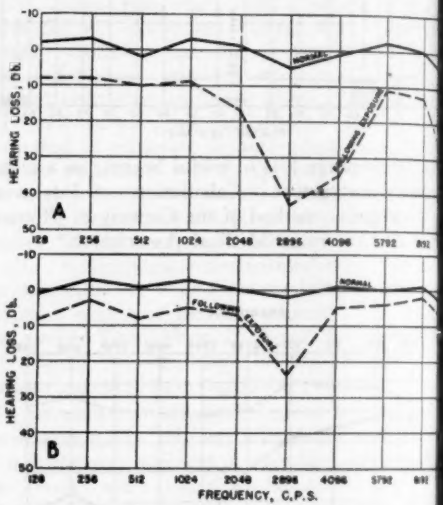
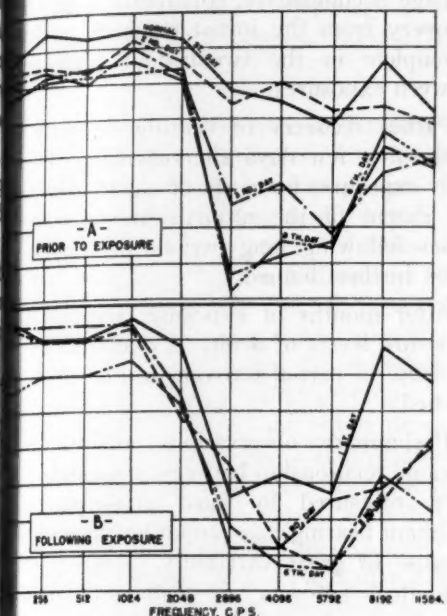


Chart 6.—Temporary losses from stand exposure: *A*, average of 3 subjects exposed to l from a 37 mm. gun at 8 feet (about 2.4 meters); *B* age of 3 subjects exposed to 25 rounds from a .30 machine gun at 6 feet (about 2 meters).

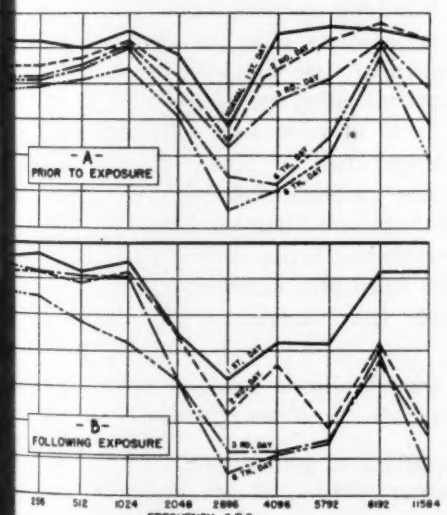
whereas the duration of the negative ph longer and of less intensity. The distribut the pressure wave in relation to the gun a positioning of the subjects for the con exposures are also indicated in figure 5.

The immediate results of a single exposu shown in figure 6. The slight but definite tion in acuity following exposure to 1 from the 37 mm. gun is apparent. The of exposure to 25 rounds of the .30 calibe are less clearcut though paralleling results single exposure. The large number of (25) required to produce minimal effect flexible control of exposure. This plus th that the small round does not require ext range facilities makes this method of exp very satisfactory for experimental use.

cumulative nature of the acoustic loss with d exposure is shown in figure 7. In gen- e effects of single exposures after the first e same as those evident immediately after tial injury. When measured after a four hour interval, however, an apparent



7.—Cumulative hearing loss following routine es of an unprotected ear. Audiograms of patient n prior to and immediately following exposures.



8.—Cumulative hearing loss following routine es of an unprotected ear. Audiograms of patient to and following exposures.

ative effect appears as the result of incom- ecovery. Exposures were not continued the eighth day because of the severe levels airment that had been reached. The results exposure of a second subject are presented in figure 8. This subject exhibited somewhat more regular behavior, particularly with respect to summation of exposure and retardation of recovery.

The characteristics of the hearing loss in the experimental subjects were like those previously recorded in the following respects: 1. Air conduction was better than bone conduction. 2. In the Weber test hearing was lateralized to the less involved side. 3. Loss was greater for higher pitched tones. 4. Tinnitus was frequently present

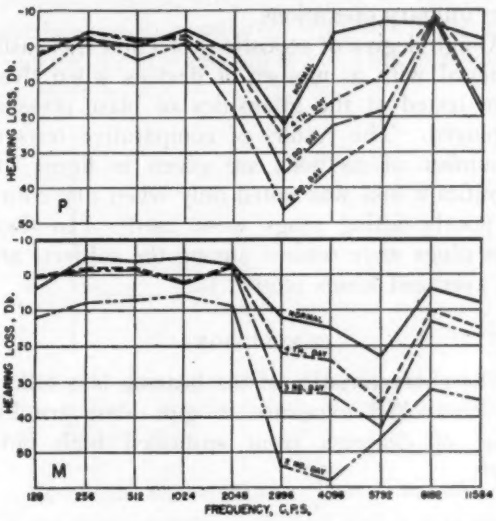


Chart 9.—Audiograms of patients M and P following last exposure to gun blast. They show increasing recovery of hearing.

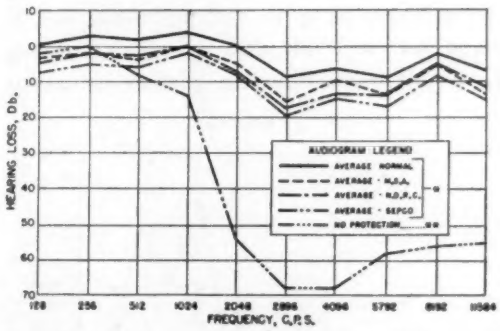


Chart 10.—Temporary hearing losses following standard exposure of subjects wearing three protective devices. Each of the audiograms indicated by the single asterisk represents an average of 12 test subjects, each wearing three test devices for three periods of exposure. The audiogram indicated by two asterisks is that of the control subject. *M. S. A., N. D. R. C.,* and *Sepco* are abbreviations for protective devices developed by the Mine Safety Appliances Council, the National Defense Research Committee and the Safety Ear Protector Company, respectively.

and often persistent. 5. The tympanic membranes were intact. (Injection of the handle of the malleus was occasionally seen.) 6. Loss was first evident at the frequencies 2896 to 5792 and

later appeared in the adjacent lower and higher frequencies. Hearing of low pitched tones was largely unaffected.

Recovery following termination of the repeated exposures was regular (fig. 9) and on the first day amounted to a 10 to 20 decibel decrease in threshold in the frequency previously most affected. There was no clearcut evidence from this small group that the rate of recovery was exponential in character. Much additional study of recovery rates and end points is required for the management and the prognosis of deafness from military operations.

A high degree of acoustic protection was easily achieved with a number of devices when these were tested at the intensities of blast pressure employed. The results of comparative tests of a number of methods are given in figure 10. Significant loss was noted only when dry cotton or poorly fitting plugs were used. (In these tests plugs were rotated among the subjects and the averaged losses plotted.)

CONCLUSIONS

The characteristics of the hearing loss following controlled exposure to gun blast are like those of deafness from sustained high noise levels.

Acoustic injury and loss are comm gunnery instructors, artillerists and potentially serious partial deafness m expected to occur in significant numb military personnel.

With repeated equal exposures, a damage is cumulative, apparently largely b recovery from the initial traumatic respo incomplete in the twenty-four hour in between exposures.

Partial recovery of hearing regularly in the first few days after cessation of re daily exposures up to six or eight. The ra the extent of the ultimate recovery fro losses following long periods of exposure to be further defined.

After months of exposure, recovery t exposure levels of acuity is doubtful; ther evidence of partial recovery in only 2 of 1 studied.

Preliminary observations indicate tha obvious relationship between magnitude of sure, measured by blast pressures, an resultant hearing loss cannot be narrowly d because of great variability in the respo individual subjects, as well as uncontr variables in the behavior of blast waves.

AERO-OTITIS MEDIA AND LOSS OF AUDITORY ACUITY IN SUBMARINE ESCAPE TRAINING

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Medical Officer in Charge, Medical Research Department, United States Submarine Base
NEW LONDON, CONN.

rty per cent of the men undergoing sub- escape training at the United States arine Base, New London, Conn., have difficulty leading to aero-otitis media and int loss of auditory acuity. In this train- very candidate for the Submarine School bjected to 50 pounds (22.5 Kg.) of air re in a recompression chamber, a pressure lent to 3.4 atmospheres. Successful com- n of this training is a prerequisite for ng the Submarine School. Only those men have passed the physical examination are o the escape training tank. Because of the rity between the problem of submarine hat of flying personnel, my associates and that our findings are of particular interest. paper presents an analysis of the extent of damage associated with this training and es possible preventive and therapeutic dures.

me of the earlier findings were presented in er by Shilling and Everley, published else- e.[1] That was one of a series of articles rning auditory loss and dealt with the loss uity encountered in men going through the e training tank. Ten per cent of all sub- on whom the study of that report was failed to ventilate the middle ear properly; oscopy we noted resultant damage ranging the way from very slight congestion to lete rupture of the drum with frank hemor- from both the external canal and the chian tube."

the 152 men whose aural difficulty was osed as aero-otitis media in that series, 18 with the more acute conditions showed an average drop in auditory acuity of 12.7 to 23.9 decibels when compared with a control group equated for age and number. This is illustrated in chart 1.

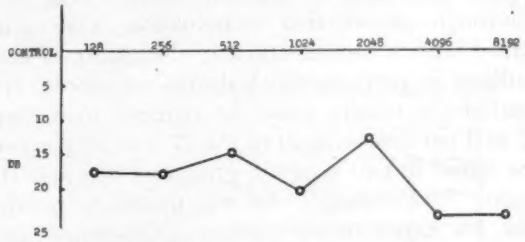

Chart 1.—Hearing loss of 18 men with acute aero-otitis media as compared with 18 controls equated for age. *DB*, decibels.

Some of the auditory losses in the latter group were actually disabling, and it was pointed out in that paper that aviators, too, would experience trouble as the result of such changes of pressure. This prediction could be made since it was observed that subjects experienced their greatest difficulty with the first few pounds of pressure—usually no more than that to which

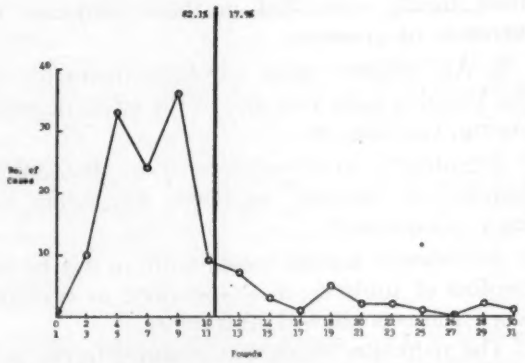

Chart 2.—Pounds of increase of pressure at which candidates for the submarine school failed in the pressure test.

aviators are subjected during certain maneuvers. This is illustrated in chart 2; it will be noted that over 82 per cent of the failures occurred below the first 11 pounds (5 Kg.) of pressure. Of course,

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esented at the annual meeting of the American my of Ophthalmology and Otolaryngology in go, Oct. 8, 1944.

is article has been released for publication by the on of Publications of the Bureau of Medicine and ry of the United States Navy. The opinions and set forth are those of the writer and are not to nsidered as reflecting the policies of the Navy rtment.

Shilling, C. W., and Everley, I. A.: Auditory y in Submarine Personnel, U. S. Nav. M. Bull. 4-686, 1942.

this is to be expected, for it is in this range that the greatest proportionate change of air pressure occurs. This change follows a logarithmic curve, as pointed out by Haldane and others.

The statements contained in the second part of the paper concerning auditory acuity may be open to question, since it can be argued that comparison with normal control groups is not as satisfactory as taking audiograms on the same subject before and after changes of pressure and comparing these.

Dr. R. W. Teed,[2] of our laboratory, continued this study and found that by otoscopy and nasopharyngoscopy one could fairly well predict which ears would suffer damage during the 50 pound test, and it was his opinion that if a thorough preselection examination were combined with a routine check of the ability of each subject to perform the Valsalva maneuver, otopathologic results could be reduced to a mere 2 to 3 per cent instead of the 27.5 to 30 per cent he found in two separate groups of 858 and 708 men. Unfortunately, he was unable to provide for his experimental groups audiograms taken before and after changes of pressure, so that his statements concerning hearing losses are general in nature.

Following the two pieces of work just mentioned, a major change was instituted in the manner of giving the pressure test. Five points can be emphasized, which might be considered to reduce failures:

1. A careful selection was made from the standpoint of abnormalities of the ears, the nose or the throat.

2. Intelligence and emotional stability were more rigidly controlled in those subjected to increases of pressure.

3. All subjects were carefully instructed in the Valsalva maneuver and in the effect of swallowing, yawning, etc.

4. Subjects were encouraged to discontinue increase of pressure whenever discomfort became pronounced.

5. Pressure was increased with an eye to the comfort of subjects; it was stopped or reversed when subjects showed discomfort.

The reduction which was obtained in the percentage of disqualifications may perhaps be referred to these factors, as well as to the fact that the experimental groups were tested in the summer months when infections of the upper respiratory tract are at a minimum. In one of these groups of 90 subjects, chosen completely at random from candidates for the Sub School, audiograms were taken before an these subjects were given the pressure te this experimental group 62 subjects, pers questioned, reported no noticeable pain in ear. The decibel change in acuity in th ears between the first audiometric test a retest is presented in chart 3 *A*. As co with a group in which no subjection to inc pressure intervened, it is seen that the a change is generally negligible for subject report no discomfort.

Some change at 4096 and 8192 may, ho be noted even in this group—due perh inclusion of subjects who felt pain but ref from reporting it. Chart 3 *B* shows the bution of changes in acuity at these freque The zero vertical represents no change i postpressure audiogram; the preponderan area under the curve on the "Loss" side

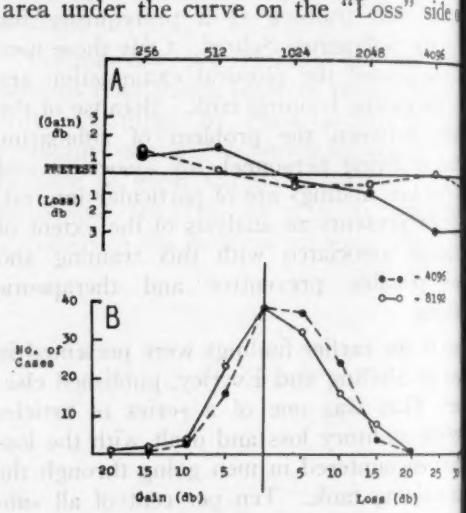
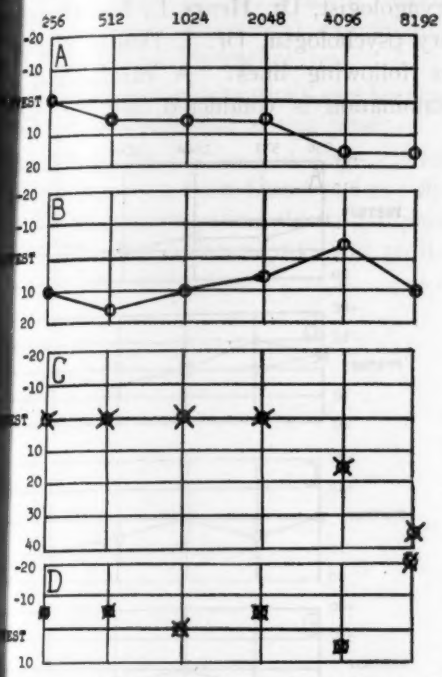


Chart 3.—*A*, mean decibel change between pos sure audiometric test and audiometric retest with n jection to increase of pressure in the interval. circles represent postpressure audiometric curve; circles, audiometric retest curve. *B*, distributi hearing gains and losses at specific frequencies and 8192) on postpressure audiograms of men rep no difficulty with increase of pressure.

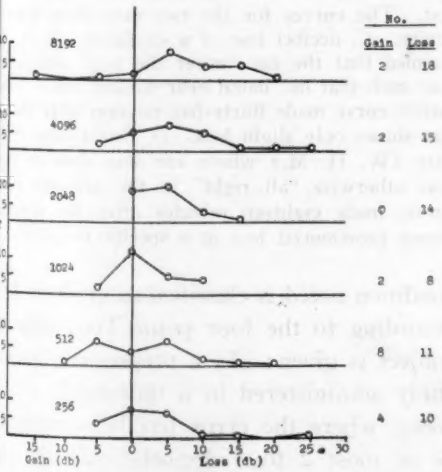
zero indicates that even under the most favo conditions, and with the subjects whose dis fort was only mild at worst, some damage be expected. (The losses at these two quencies, though small, are several times own standard errors.) Two or three a grams will illustrate the sort of thing one in such a group: Audiogram *A* in chart 4 s some loss at high tones. (It will be noted in all cases the normal base line represents audiometric study made before the pressure and the plot represents the decibel differ between the acuity recorded then and the a recorded after the pressure test.) *B* in ch

2. Teed, R. W.: Factors Producing Obstruction of the Auditory Tube in Submarine Personnel, U. S. Nav. M. Bull. **42**:293-306, 1944.

that hearing for low tones may be ; *C* illustrates specific and, for this group,



t 4.—*A*, decibel loss seventy-five minutes after ssure test of a subject (W. A. S.) who made no nt as to pain during the test. *B*, decibel loss ive minutes after the pressure test of another (R. W. M.) who did not comment on pain the test. Note that while *A* shows loss at high *B* shows loss at low tones. *C*, decibel loss at frequencies twelve minutes after the pressure a subject (R. O. D.) who refrained from men- pain if any was felt. *D*, gain in hearing after e test in a subject (R. E. L.) who made no n of pain.



rt 5.—Distribution of decibel gains and losses noted pressure audiometric studies of men who reported n the ears during the pressure test.

me loss. In some cases actual improvement be noted. Audiogram *D* in chart 4 exempli- uch a case.

If now, one considers only those ears which gave so much discomfort that the subjects were willing to report it or even to fail to complete the pressure test, one finds that under highly favorable conditions 12 per cent of all ears are involved (22 of 180).

Chart 5 shows (for all 22 ears) the frequency distribution of the changes in acuity. As in chart 4, a shift to the right of the zero line indicates a loss of acuity. It is apparent that with these ears the hearing for low tones was relatively unaffected; but for tones of 2046 and above, a loss of acuity is the rule. For example, for 4096 only 2 subjects showed improvement, whereas 7 showed 5 decibels of loss, 5 showed 10 decibels, and there were others with losses up to 25 decibels.

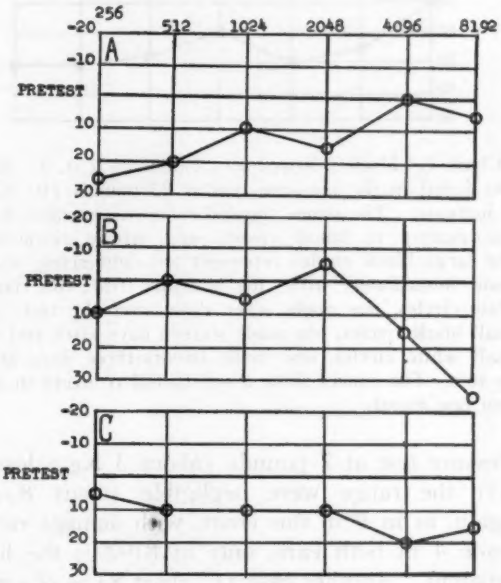


Chart 6.—*A*, decibel loss for low tones thirty-five minutes after the pressure test of a candidate (C. B.) who stated that his ears hurt a little while he was taking the test and were still buzzing. *B*, decibel loss for high tones forty-five minutes after the pressure test of a candidate (M. P. M.) who said that his ears hurt at first. *C*, decibel loss at all bands fifteen minutes after the pressure test of a candidate (J. R. G.) who failed the test at 5 pounds' increase of pressure because of pain in the ears. The damage of his ears was rated as grade 4.

When one reviews individual cases, it is clear that in the damage of the ears there is great variability. In some ears hearing for low tones is affected, as shown in audiogram *A* in chart 6; in others, hearing for high tones, as in *B* in chart 6, and in still others the loss is spread generally over the entire range, as in *C* in chart 6.

One of the earlier cases observed indicates the probability of permanent damage. In

this case (chart 7) a month elapsed before anything like normal hearing was recovered, and even then the acuity for high tones was somewhat depressed.

However, it is a somewhat surprising fact to note that in some ears suffering considerable damage the losses in acuity may be slight. Thus, in one ear rated as having damage of grade 4 (worst category) after the subject failed in the

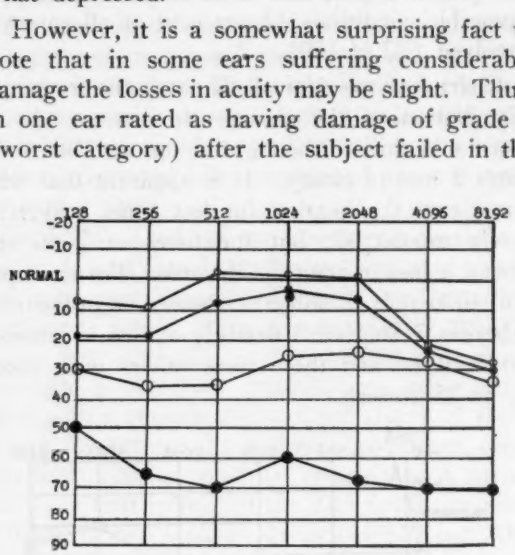


Chart 7.—Decibel losses of a candidate (M. L. W.) who failed in the pressure test at 22 pounds (10 Kg.) of increase. The drum showed severe congestion with engorgement of blood vessels and strong retraction. The large black circles represent an audiometric study made immediately after the pressure test; the large white circles, one made seven days after the test; the small black circles, one made sixteen days after and the small white circles, one made twenty-three days after the test. The curves show a substantial recovery in less than one month.

pressure test at 7 pounds (about 3 Kg.) losses over the range were negligible (chart 8 *A*). Again, as in *B* in this chart, with damage rated grade 4 in both ears, only at 8192 is the loss apparent. Another case (*C*, chart 8) is of some interest. The ear pained quite a bit—in the man's words, he "damn near walked out." However, he completed the 50 pound test, and his losses were at the highest tones only. The following audiogram *D* in chart 8 illustrates loss at a specific frequency. Cases like this may throw some light on the locus of the auditory dysfunction.

In summarizing the otopathologic observations on all experimental subjects, it may be said that about 30 per cent of them showed damage; as Teed found, it was discovered that of the 30 per cent who suffered damage, only one third reported pain.

At the present time a great deal of data is being collected on the effect of the 50 pound pressure test on otopathologic conditions and on auditory acuity; further observations are also being made on prediction, prevention and therapy of aero-otitis media. This is being conducted in our laboratory by laryngologist, Dr. Henry L. Haines, and sory psychologist, Dr. J. Donald Harris, the following lines: A careful and examination is conducted, and any

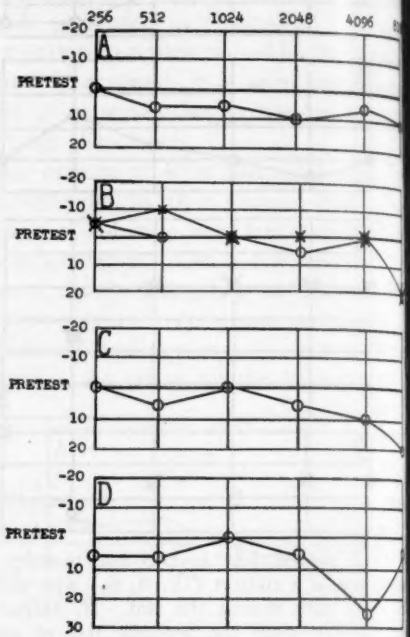


Chart 8.—*A*, decibel loss of a candidate (G. who failed at 7 pounds increase of pressure, with of the ear rated as grade 4. The audiometric curve forty minutes after the test shows little loss of *B*, decibel loss of a candidate (G. E. M.) who at 16 pounds (7 Kg.) of increase, with the dam the two ears rated as grade 4. The ears hurt the pressure test and still hurt slightly when the metric study was made, thirty-five minutes aft test. The curves for the two ears show little acuity. *C*, decibel loss of a candidate (C. A. S. claimed that the ear "never did pop" and whos was such that he "damn near walked out." The metric curve made thirty-five minutes after the p test shows only slight loss. *D*, decibel loss of a date (W. H. M.) whose ear was slow to "po was otherwise "all right" in the pressure test. curve, made eighteen minutes after the pressure shows pronounced loss at a specific frequency.

condition noted is classified as grade 1, 2, 3 according to the four point Teed scale.[4] subject is given: (1) a prepressure audiom study administered in a thoroughly sound room, where the error has been establishe be at most 2 to 4 decibels; (2) the pre test under controlled conditions; (3) an im diate postpressure examination for resi trauma of the ears; (4) a postpressure au metric study. Those subjects with se damage, grades 3 and 4, will be treated by or more of the following methods: applic

um; irradiation with roentgen rays; topi-
lications; suggestion. The group under-
treatment will be followed by making
al audiograms, additional examinations
ally, a repeated pressure test.

in preliminary observations can be made
ne opinions hazarded at this time:

l ears showing severe damage, grades
, have thus far been found to have flat-
of the eustachian orifices due to lymphoid
asia, and thus roentgen rays and radium
be of great benefit.

2. This condition has been noted to be associated with a depressed prepressure audiometric curve.

3. Under conditions of careful selection of candidates and proper administration of pressure, severe otopathologic observations with associated losses of acuity need not be as common as they have been.

4. Since this type of trauma leads to acute auditory damage, if the trauma is often repeated (as it is in aviation personnel) there may develop permanent auditory damage.

DEAFNESS WITH UNDEVELOPED MASTOID AND NORMAL TYMPANIC MEMBRANE

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During the examination of a large number of Army personnel for defects of hearing, the following problem arose: Patients were being seen who complained of deafness of varying degrees, with a normal history and with examination of the external ear, ear canal and ear drum presenting normal results. They had been given diagnoses of defective hearing of undetermined cause; yet a cause should be discoverable if looked for. The question was where to look. Histories obtained from these patients contained no references to previous aural complaints, except for deafness, which usually had been present since infancy or early childhood. In 1 case, a history of a fall in childhood was reported, but there was doubt that this could be a causative factor for the patient's deafness. In view of these negative observations and of the fact that the men had normal-appearing ear drums, roentgenograms of the mastoids were ordered, and the results were of exceptional interest, for they showed underdeveloped or undeveloped mastoids in the ears suspected of being deaf.

The question was brought up—could these be rare cases of congenital lack of development of the mastoids, rather than the result of an infectious process? However, the congenital lack of development of the mastoids should not imply the presence of some other aural defect, such as deafness. The presence of deafness usually conveys the understanding of an accompanying pathologic process. The conclusion therefore deducted was that these were cases of deafness resulting from an infectious process of the middle ear and of the mastoid in early childhood or infancy, with resultant lack of development of the mastoid cells.

The observation of a lack of mastoid cells, a result of an infectious process early in life, is not an uncommon occurrence. Pancoast, Pendergrass and Schaeffer [1] said:

> The lack of mastoid development in an adult almost invariably means an infection of the mastoid cells during the first four years of life, since most mastoid growths occur during this period. There is good evidence to indicate that the type of cellular development found in adults is the result of the degree of activity in the mastoid *anlage*. Wittmaack believed that if th is allowed to develop normally without any i being superimposed, the well pneumatized mast develop. If, however, infection does enter the the anlage will not develop normally, with the r formation of the diploic, sclerotic or mixed t mastoid.

An effort to obtain additional informat this subject was then undertaken, wit couraging results. No mention of this s was available. A request to the Surgeon eral's library, Washington, D. C., disclose one semirelated article, entitled "Otitis and matisation of the Mastoid Bone" by M Diamant.[2] Diamant, citing Eisinger, K man, Loebell and Barth, stated: ". . development of the air cell system was n fluenced by the otitis which the patien undergone in the first years of life or b operation performed. In spite of these ferences, the air cell system attained a development." This, however, apparently the observation of prominent roentgenol including Law,[3] Gerber [4] and Pancoast, Pe grass and Schaeffer.[1] They stated that an involvement of the middle ear by an infe process may result in definite sclerosis o adjacent mastoid, with a resultant lack o velopment.

The finding of a sclerotic mastoid is not mon. However, when seen in the prese a pathologic state of the ear, it signifies a s early infection, with impairment of norm velopment. Such mastoids, in which de ment has been impeded, may present cond varying from complete sclerosis through p pneumatization (diploic bone) to complete matization of the mastoid. This process gradual transition indicating a growth de ment. Should the normal growth be resti by a pathologic process, an intermediary

1. Pancoast, H. K.; Pendergrass, E. P., and Schaeffer, J. P.: The Head and Neck in Roentgen Diagnosis, Springfield, Ill., Charles C Thomas, Publisher, 1942.

2. Diamant, M.: Otitis and Pneumatization Mastoid Bone: Clinical-Statistical Analysis, Act laryng., 1940, supp. 41, pp. 1-153.

3. Law, F. M.: Annals of Roentgenology: A of Monographic Atlases; Mastoids, Roentgenol Considered, edited by J. T. Case, New York, P Hoeber, 1920, vol. 1.

4. Gerber, I.: Some Observations of Mastoid ture as Revealed by Roentgen Ray Examination, Roentgenol. **6**:1-11 (Dec.) 1919.

result. These conclusions are concurred ancoast, Pendergrass and Schaeffer [1] and In some cases there may be no known of otic infection in infancy or early child- produce this end result. In such cases sence of deafness in the affected ear may clue that is needed. Guthrie [5] stated: e ear suppuration is of course a common f deafness. Many deaf adults know that firmity was caused by otitis media dating subsequent age." Undoubtedly, many of these early diseases go unnoticed and undiagnosed.

Continuing with the same thought, Diamant,[2] citing the findings of Cheatle, Albrecht and others, had the following to say:

> It is now a widely accepted view that persons with small air cell systems of the mastoid bone present an increased tendency to chronic otitis. HEINE (1904) and CHEATLE (1906) were the first to publish investigations of this problem and to try to prove this theory. By these authors only cases of chronic otitis were taken into consideration. Later on a number of authors have paid attention to these problems and directed their investigations towards the connection of both chronic and acute otitis with the structures and sizes of the air cell system.
>
> In the account given above of the normal air cell system of the mastoid bone, we pointed out that definite data as to what is normal are lacking. Under such circumstances, it is evident that it must be very difficult, not to say impossible, to decide definitely what are deviations from the normal. Investigations carried out in order to elucidate the state of the air cell system, in cases of otitis media lack materials of comparison and therefore are incapable of yielding conclusive results.

Observations of the Size of the Air Cell System in Cases of Otitis (Modified from Diamant [2])

oor	Character of Material of Investigation	Number of Cases or Ears Examined	Classification and Percentage Distribution		
			%	%	%
.....	Cases of chronic otitis observed at autopsy	20 ears	Cellular 10	.....	Diploic-sclerotic 90
.....	Cholesteatomotitis	63 ears	.....	.....	Compact mastoid bone 100
	Roentgenologically observed cases of chronic otitis without cholesteatoma, "bone suppurations"	24 ears	.....	Greatly reduced air cell system 16.7	Compact mastoid bone 83.3
	Chronic otitis, "mucosa suppurations"	23 ears	Normal pneumatization 4.3	Clearly reduced pneumatization 56.6	Compact mastoid bone 39.1
	Acute otitis	58 ears	Normal pneumatization 81.1	Reduced pneumatization 15.5	Almost compact 3.4
.....	Roentgenologically observed patients operated on for mastoiditis	100 ears	Wholly normal pneumatization 33 (+6 ?)	More or less reduced pneumatization 58	Incomplete pneumatization, spongiosa and sclerotic 3
.....	Roentgenologically observed cases of otitis	737 cases	Normal or almost normal 46.4	Reduced pneumatization 25.4	Compact or almost compact mastoid bone 28.2
.....	Roentgenologically observed cases	557 cases	Nonarrested pneumatization 41	.....	Arrested pneumatization 59
.....	Roentgenologically observed cases of "severe acute otitis"	500 ears	Pneumatic 99	.....	Noncellular mastoid bone 1
.....	Roentgenologically observed cases of otitis	604 cases	Good pneumatization 29.3	Medium pneumatization 32	Completely arrested pneumatization 38.7
, Druss Rosen, 1935	Autopsy cases of petrositis	24 ears	Pneumatic 50	Mixed 37.5	Diploic 12.5
.....	Roentgenologically observed cases of infant otitis	89 ears	Good pneumatization 47.2	Partial pneumatization 28.1	Nonpneumatic 24.7
.....	Roentgenologically observed patients operated on for mastoiditis	209 ears	Extensive pneumatization 79.4	Pneumatization with slight extension 15.3	Pneumatization restricted to vicinity of antrum 5.3
en.....	Roentgenologically observed cases of acute mastoiditis	100 ears	Normal pneumatization 10	First grade, reduction in pneumatization 35; second grade, 40	Compact mastoid bone 15

childhood. It is also possible, as some ities suggest, that otosclerosis, the com- t of all forms of deafness in adult life, is uel of middle ear inflammation in child-

oting Guthrie again: "Suppurative otitis is an extremely common disease in early Judging from the results of postmortem nation, it appears to be present in approxi- 80 per cent of bodies of infants under ear, whatever the cause of death." Guthrie tated, "During the first two years of life, suppuration is more frequent than at any

The accompanying table by Diamant gives a tabulation of comprehensive investigations so far carried out on the relation between the size of the air cell system and different forms of otitis.

Guthrie, D.: A Prognosis of Middle Ear Sup- in Children: A Review of 500 Cases, J. Laryng. 41:305-315 (May) 1926.

This table shows that the figures given are extremely variable. Referring to the table, in the series of cases presenting the most pronounced inhibition of pneumatization, one finds that the values given range from 3.4 to 100 per cent, and in the intermediate series, as to degree of pneumatization, from 15 to 58 per cent, the cases of chronic suppurative otitis media due to cholesteatoma show complete inhibition in 100 per cent and those of acute otitis media in 3.4 per cent.

With this consideration in mind, one may be justified in concluding that mastoid development may be prevented from reaching maturity, or complete pneumatization, as a result of an infectious process during the developmental period, which is up to 5 years of age, as stated by Stewart,[6] Pancoast, Pendergrass and Schaeffer [1] and Granger.[7]

The presence of deafness is a common observation in the presence of a chronic otitis media with or without suppuration. Causes of deafness of patients with normal ear drums are always under question until a sufficient explanation is obtained. This means ruling out otosclerosis, acoustic trauma, otitis media and toxic neuritis due to various causes.

When an audiogram, combined with a normal history, shows a patient to have a conduction deafness and/or mixed deafness which has been present since early childhood and when this observation is accompanied with the observation of an apparently normal tympanic membrane, and with roentgenograms showing a lack of proper mastoid development on the involved side, consideration should be given to otitis media in childhood as the causative factor.

CONCLUSIONS

1. Deafness dating from early childhood in the presence of a normal tympanic membrane should be checked by roentgenograms of the mastoid.

2. An undeveloped mastoid or a partially developed mastoid on the side of the deaf ear should arouse the suspicion that otitis media in early childhood may have been the cause for the deafness.

REPORT OF CASES

The following cases are presented to illustrate this paper:

CASE 1.—S. M., aged 35 years, gave a history of deafness gradually progressive since childhood, for which no apparent cause was known. No history of ch diseases and no known history of otic infecti found. Examination showed the ears normal in a ance. An audiogram showed bilateral conductio ness. Hearing for whispered voice was 1/15

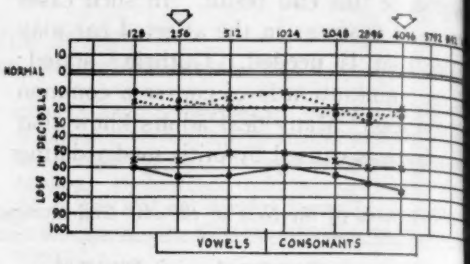


Chart 1 (case 1).—Audiogram. The curve left ear is indicated by crosses and that for the ear by circles; the dotted line indicates bone condu the solid line, air conduction.

right ear and in the left ear, 2/15. The roentgen report on the mastoid follows: "Both mastoids are developed and densely sclerotic throughout. The c are consistent with an old bilateral sclerosing mast probably present since childhood."

CASE 2.—J. C., aged 25 years, gave a history of deaf in his right ear all his life, cause unknown. was no history of injury to the ears and no in in the ears. The patient stated that he had measl

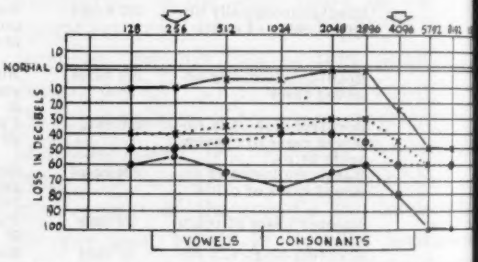


Chart 2 (case 2).—Audiogram. Symbols are the as in figure 1.

mumps at 6 years of age. On examination, the presented a normal appearance. The audiogram sh a conduction deafness on the right side. Hearin whispered voice was: right ear, 4/15; left ear, The roentgenologic report of the mastoids follows: mastoids are well developed. There is a greater a of sclerosis surrounding the right antrum than surr ing the left."

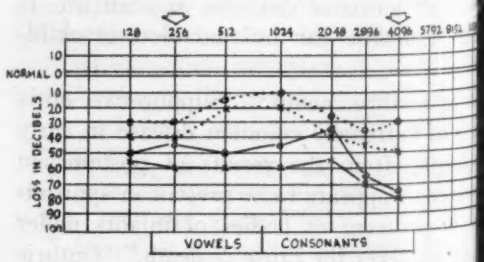


Chart 3 (case 3).—Audiogram. Symbols are the as in figure 1.

CASE 3.—F. C., aged 27 years, a soldier, state had loss of hearing in his right ear following his struck on the right ear by a shell case in March Since this incident, there had been a discharge

6. Stewart, W. H.: Radiographic Findings Illustrating the Anatomic Development of the Mastoid Bone, Ann. Otol., Rhin. & Laryng. **22**:677-699, 1913.

7. Granger, A.: Radiological Study of the Paranasal Sinuses and Mastoids, Philadelphia, Lea & Febiger, 1932.

. The patient also stated that he was hit on ear by a baseball in January 1942; however, ad been no history of other injury or infection discharge from the left ear. On examination, presented a perforation of the right tympanic ne involving the posterior inferior quadrant with mucoid discharge in the canal. The left ear , and the tympanic membrane appeared normal. iogram was made, and hearing for whispered as found to be 5/15 in the right ear and 2/15 in ear. Roentgenograms of the mastoid were . The roentgenologist's report was: "Studies mastoids show the presence of dense sclerotic s of equal degree on both sides. There were no aerated cells present. The observations are those of an old bilateral chronic sclerosing mastoiditis."

In this case although the patient denies a history of infection of the ear and dates his loss of hearing to the injuries previously mentioned, a close examination with audiogram and roentgenogram previous to these injuries would have suggested a deafness already present. The presence of damage to the ears by an infection in early childhood probably predisposed the ears to greater susceptibility to injury. The partial damage already done by the infection probably allowed slight trauma to produce a much greater degree of injury than one would normally expect.

CARCINOMA OF THE LARYNX

SIGNIFICANCE OF HISTOPATHOLOGIC STUDY OF SERIAL SECTIONS; PRELIMINARY REPORT

MAURICE F. SNITMAN, M.D.
CHICAGO

Since the performance of the first total laryngectomy by Billroth and Czerny in 1873, voluminous reports or various aspects of cancer of the larynx have appeared in the literature. Generally, they were concerned with problems of early diagnosis, modes of therapy, surgical technics, histopathologic observations and the radiosensitivity of the growths. As the attention to cancer of the larynx increased, the rate of cures seemed to become larger. This improvement was predicated mainly on earlier recognition of true cordal lesions clinically considered intrinsic and amenable to local removal by laryngofissure. With this method, recent statistical analyses of large series of cases show that on an average cures are obtained in 80 per cent. With laryngectomy, analyses of similar series indicate that on an average cures are possible in approximately 50 per cent. A study of the failures following both types of procedures reveals that local recurrence following laryngofissure is the rule, while metastasis to the regional lymph nodes is the most common complication after laryngectomy. When recurrence occurs, the logical conclusion is that resection of the lesion by laryngofissure was incomplete, while in the presence of metastases in the lymph nodes of patients who have undergone laryngectomy it is reasonable to assume that malignant cells were already harbored in the regional lymphatics.

In addition to the improvement of the prognosis of cancer of the larynx occasioned by the factor previously stated, it seems that further reduction in the number of failures might result from combined clinical and pathologic studies of the spread of laryngeal cancer. Since such studies have contributed considerably to the present therapy of cancer of other body structures, they should be applied to cancer of the larynx. To my knowledge, only one serious attempt has been made to carry out such studies. I refer to the work of Leroux-Robert,[1] published in 193 had as his particular objective the diagn the extension of malignant growths and form of therapy based on studies and comp of the pathologic anatomy, clinical feature roentgen findings. The investigation en 60 patients with laryngeal carcinoma which sitated laryngectomy, hemilaryngectomy an rotomy. Serial section of each specime mitted the author to study the mode of ext from the original site. Although he g lengthy discussion of the various histologic illustrated by photomicrographs, he do describe or illustrate the microscopic spread.

One can conclude only that his determi of the spread was founded on observati gross sections. After a careful study o publication, it is difficult to decide on what the author arrived at his conclusions. T emphasized by his statement that the true epithelioma seldom reaches the anterior missure, except when the lesion is not l to the cord but has grown to regions abov below. Such a statement is contrary to c and pathologic observations.

Blumenfeld,[2] cited by Denker and K found that carcinoma limited to the true has a tendency to grow to the anterior comm and on to the opposite cord. He explains th the basis of the arrangement of the lymph c of the cord, called Reinke's space. This pot space is situated between the vocal ligamen the epithelium and is limited superiorly inferiorly by the adherence of the perim of the vocalis muscle to the mucosa. For time the lesion of the cord is limited b confines of this space and has a tendenc extend along it to the opposite cord vi anterior commissure.

The present study, which was begun in O ber 1943, deals with the results of a re

From the Department of Laryngology, Rhinology and Otology, and the Tumor Clinic, University of Illinois College of Medicine.

1. Leroux-Robert, J.: Les epitheliomes i larynges, Thesis, Paris, Gaston Doin & Cie, 1936.

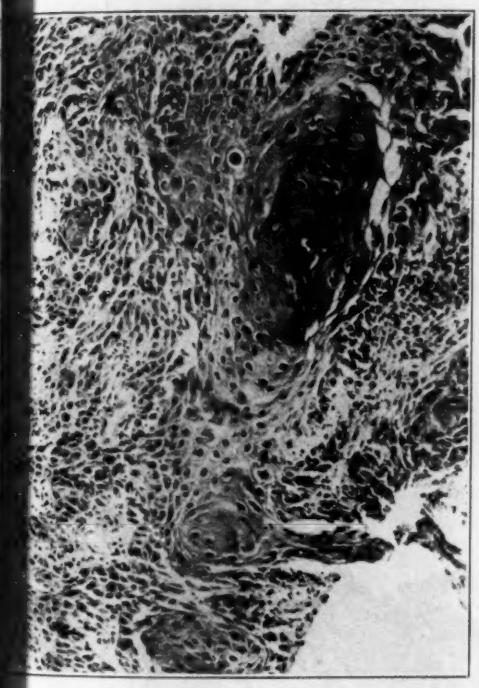
2. Blumenfeld, F., cited by Denker, A., and K O.: Handbuch der Hals-, Nasen- und Ohrenheil Berlin, Julius Springer, 1929, vol. 5, p. 416.

study of a specimen removed by thyrotomy. er serial studies of specimens removed by aryngectomy and others removed by thy- will be reported on at a later time.

REPORT OF A CASE

E. K., a woman aged 40, was seen first on , 1943, with a complaint of hoarseness of ten duration. She stated that she had suffered from of laryngitis every fall for the past five years. er, since the last attack, in September 1942, the ess had increased gradually, and in the course past several weeks she had experienced three of asthma. She also gave a history of seasonal nseasonal allergy.

mination of the larynx disclosed a small warty , with a broad base, on the anterior half of the al cord. Grossly it did not involve the anterior ssure or the right cord. The cords were freely e. Serologic tests gave negative results. Biopsy, 7, revealed hornifying squamous cell carcinoma). Laryngofissure was performed by another ologist on August 17. During the separation of yroid cartilage in the midline, the anterior com-



1.—Preoperative biopsy specimen showing well ntiated squamous cell carcinoma with keratiniza- nd some tendency to pearl formation.

e was accidentally opened. One-half centimeter of terior portion of the right true and false cords was ed along with the complete left cord, including the process of the arytenoid. The anterior commissure he right cord appeared normal.

roscopic Study.—The quadrilateral block of tissue ixed and mounted in paraffin in the usual manner. was cut at right angles to the cords (fig. 2), each being 6 microns thick. Every tenth section was ted and stained with hematoxylin and eosin. It is ed that a 60 micron gap would in no way affect a proper interpretation of the pathologic sequences. The upper cutting surface of the block represented the sectioned right true and false cords.

The first section, which was that of the free cut end of the right true and false cords (fig. 3 *A*), showed marked thickening of the epithelium of the ventricular surface of the true cord. This thickened epithelium presented an atypical arrangement and an increase in number of cells. Hyperchromatic nuclei were seen here and there, and mitoses were in evidence to a much greater extent than in simple epithelial hyperplasia. The picture was that of a typical cancer in situ (fig. 5 *A*)

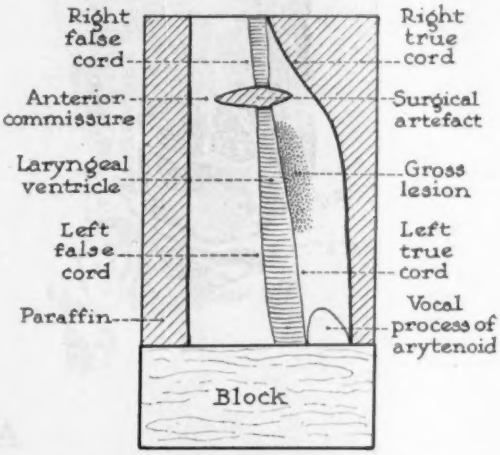


Fig. 2.—Diagram of a laryngofissure specimen mounted in a paraffin block. The first section represents photomicrograph *A* of figure 3.

which extended laterally along the ventricular surface of the true cord but at no time approached the lateral extremity of the ventricle. Medially, it ended abruptly, showing incomplete removal. As the anterior commissure was reached, there was increasing subepithelial invasion by poorly differentiated squamous cell carcinoma, but the specimen included normal epithelium on the medial surface of the cord, inferior to the lesion. The transition between the cancer in situ and the normal epithelium was sudden (fig. 6 *A*). Here the comparison between the larger atypically arranged cells of the neoplasm and the typically arranged smaller cells of the normal epithelium was exceptionally clear.

The extent of the malignant growth of the anterior commissure and the anterior extremity of the left true cord could not be determined because of the surgical artefact (fig. 4 *A*). However, the specimen contained a liberal margin of normal epithelium. As one looked posteriorly along the left true cord, heteroplasia became less extensive, the lesion being limited to the glottic edge of the cord. There was beginning localized keratinization of the cells, showing clear intercellular bridges (fig. 6 *B*). When the junction of the middle and anterior thirds of the cord was reached, a typical hornifying squamous cell carcinoma was in evidence. It was limited in its entire extent to the glottic edge of the true cord.

Before the appearance of the vocal process of the arytenoid, the hornifying carcinoma was no more in evidence, being replaced by a small amount of cancer in situ and a small patch of pachyderma. The atypical epithelial hyperplasia stopped rather abruptly, and throughout the remaining sections which included the main portion of the vocal process, fairly normal epithelium was found.

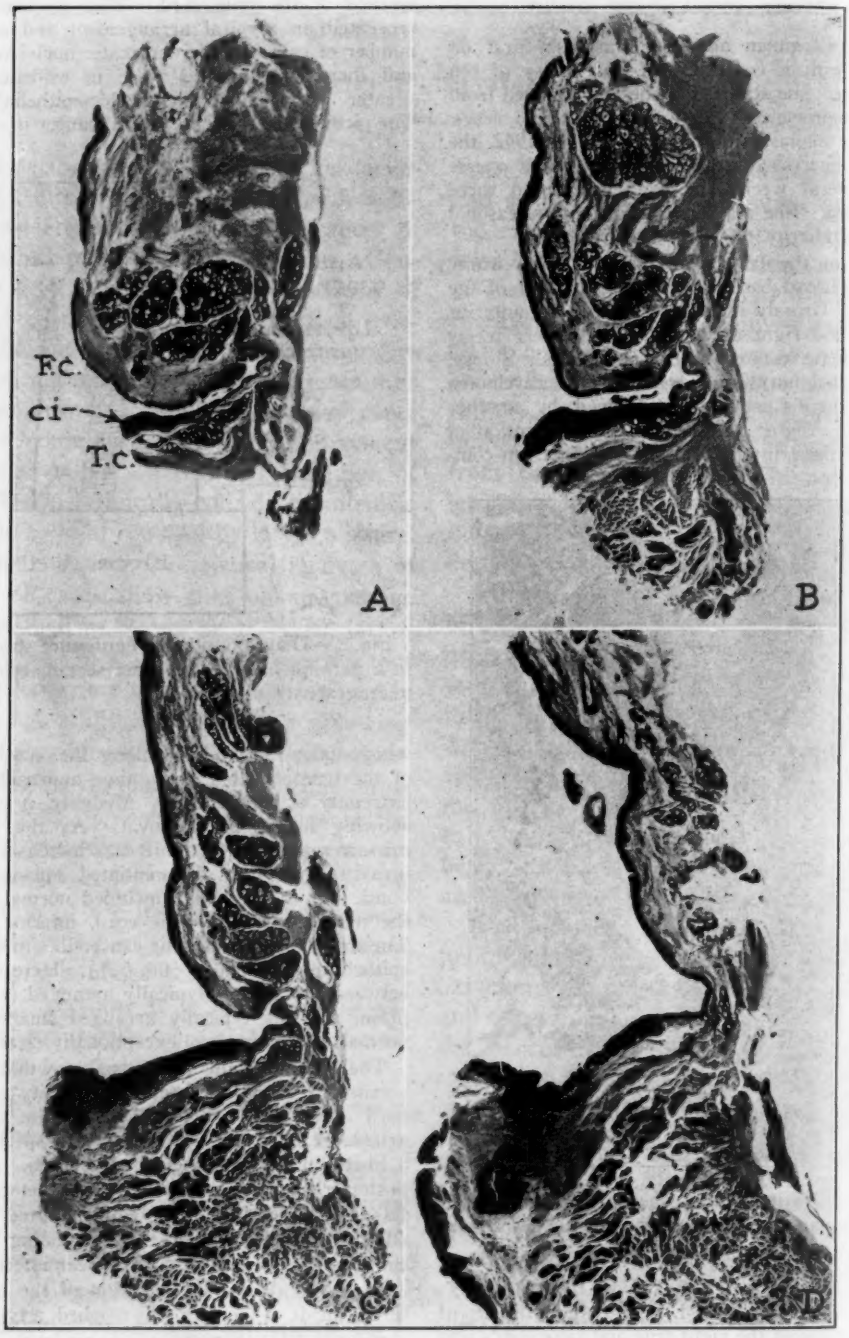
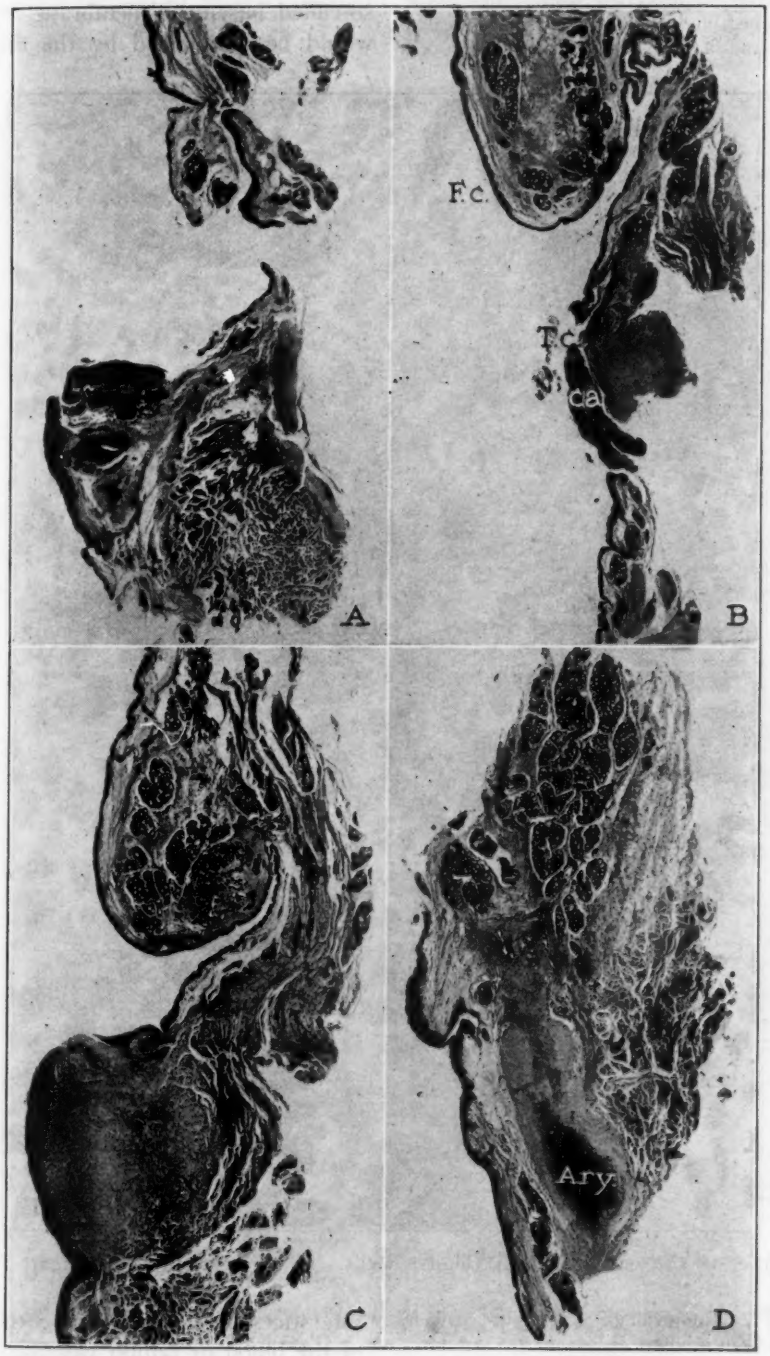


Fig. 3.—The right true and false cords: *A*, first section of block in figure 2. The cancer in situ (*ci*) s incomplete removal of the lesion. *F.c.*, false cord; *T.c.*, true cord.

B, *C* and *D* demonstrate the increased extent of the cancer in situ. Subepithelial invasion of poorly diff tiated squamous cell carcinoma becomes more evident as the anterior commissure is approached. The lesion not reach the lateral limit of the ventricular surface of the true cord. Only in section *D* is the lesion wel cumvented.



4.—Sections of left true and false cords: *A*, section near the anterior commissure showing the surgical
t of the ventricle and the increased subepithelial invasion. *B*, junction of the anterior and middle thirds
left true cord, showing atypical epithelial hyperplasia at *ca*. *C*, middle third of the true cord, which was
e of the preoperative biopsy specimen. The epithelial defect is replaced by granulation tissue. As in *A*
the lesion is well surrounded by normal epithelium. *D*, region of the vocal process of the arytenoid. The
ed epithelium does not present any atypical qualities, and as the last section of the series is approached
ickening gradually disappears.

Progress.—Following several urgent requests, the patient returned for reexamination of her larynx on April 11, 1944. Direct laryngoscopy disclosed a web formation at the anterior commissure, but the right true cord appeared normal. The web was removed and several pieces of the anterior third of the right true cord were likewise removed for histologic study. The tissue was carefully sectioned, and microscopic study revealed carcinoma in situ and a few areas of squamous cell carcinoma (fig. 7). Removal of the right cord by laryngofissure has been advised.

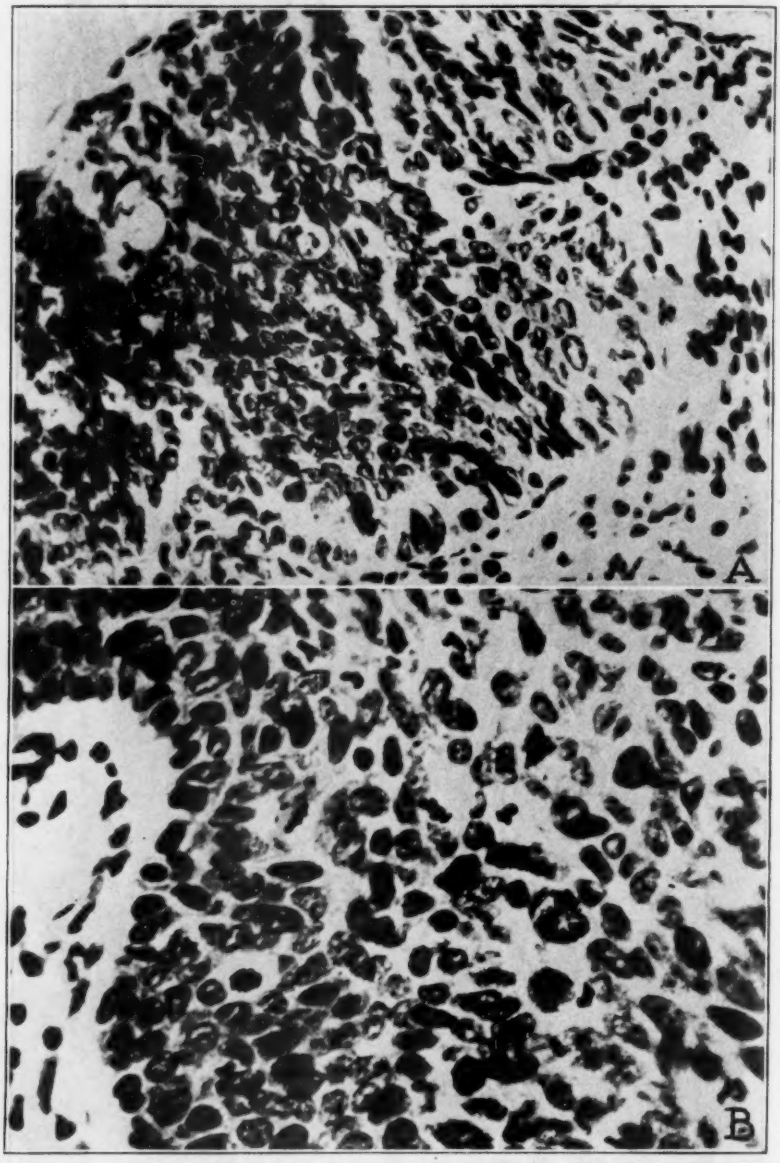


Fig. 5.—*A*, cancer in situ of *A*, figure 3 (high power). *B*, cancer in situ of *C*, figure 3 (high power

COMMENT

The unusual presence of carcinoma in situ in the larynx of this patient merits further academic consideration.

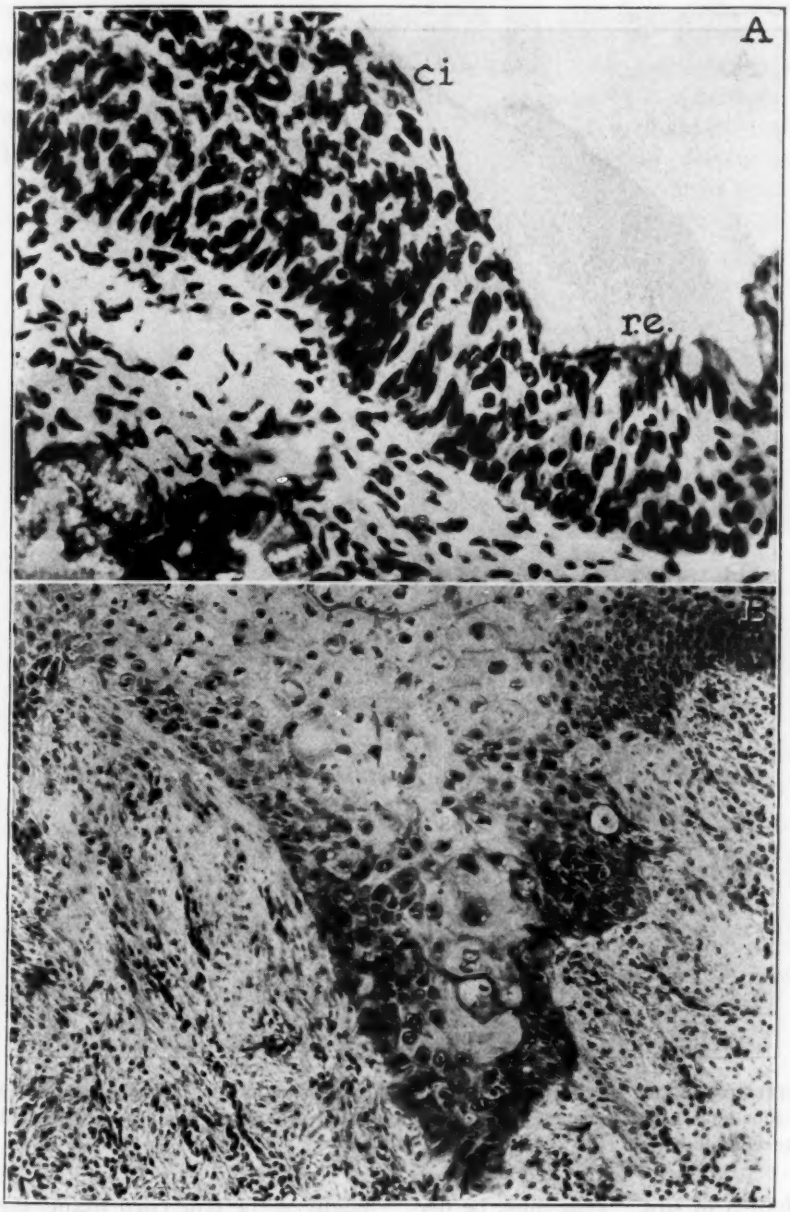
Broders [3] stated that carcinoma in situ is a condition in which malignant epithelial cells and their progeny are found in or near the position occupied by their ancestors before the ancestors underwent malignant transformation. At they have not migrated beyond the junction the epithelium and the connective tissue, the so-called basement membrane. Such migration would be manifested by the cells entering interstices of the connective tissue or any of the blood or lymph vascular system.

The diagnosis of carcinoma in situ, as of in general, is based chiefly on altered characteristics in contradistinction to the situation. The nuclei as compared with

3. Broders, A. C.: Carcinoma in Situ, Con with Benign Penetrating Epithelium, J. A. M. 1670-1674 (Nov. 12) 1932.

ormal cells have an increased avidity for sophilic dyes, are usually increased in size ctually and in relation to the cytoplasm, are ntly irregular, are not infrequently in a of atypical or pathologic mitosis and are onally observed in groups in the form of giant cells.

in situ may be many years ahead. In a study of carcinoma in situ of the stomach and its bearing on the histogenesis of malignant ulcers, Mallory [4] showed cytologic changes that are in close accord with my observations. There are hyperchromatic nuclei and cytoplasm, large intensely staining nucleoli and increased numbers



g. 6.—*A*, sudden transition from respiratory epithelium (*r.e.*) of the ventricular surface of the true cord cer in situ (*ci*). *B*, well differentiated squamous cell carcinoma of the middle third of the left true cord power).

get's disease of the nipple and the so-called ncerous dermatosis of Bowen have in recent been classified as squamous cell carcinoma. two conditions are ideal examples of carin situ. The time of invasion of carcinoma

of mitotic figures. The nuclei are large absolutely and relatively in proportion to the size of the

4. Mallory, T. B.: Carcinoma in Situ of the Stomach and Its Bearing on the Histogenesis of Malignant Ulcers, Arch. Path. **30**:348-362 (July) 1940.

cells. The most striking feature is the disorientation of the nuclei, suggesting complete loss of polarity in the cells. The sharp distinction between normal epithelium and carcinoma in situ is an important diagnostic sign, since transitional changes are entirely lacking in carcinoma in situ. Mallory noted also that an established carcinoma may extend for significant distances along the left true cord and not involving the an commissure. The block of tissue included 0.5 cm. of the anterior end of the right tru false cords. The microscopic study re incomplete removal of the cancer in situ o right true cord.

Although the lesion involved almost e sively the region of the glottic lip of the

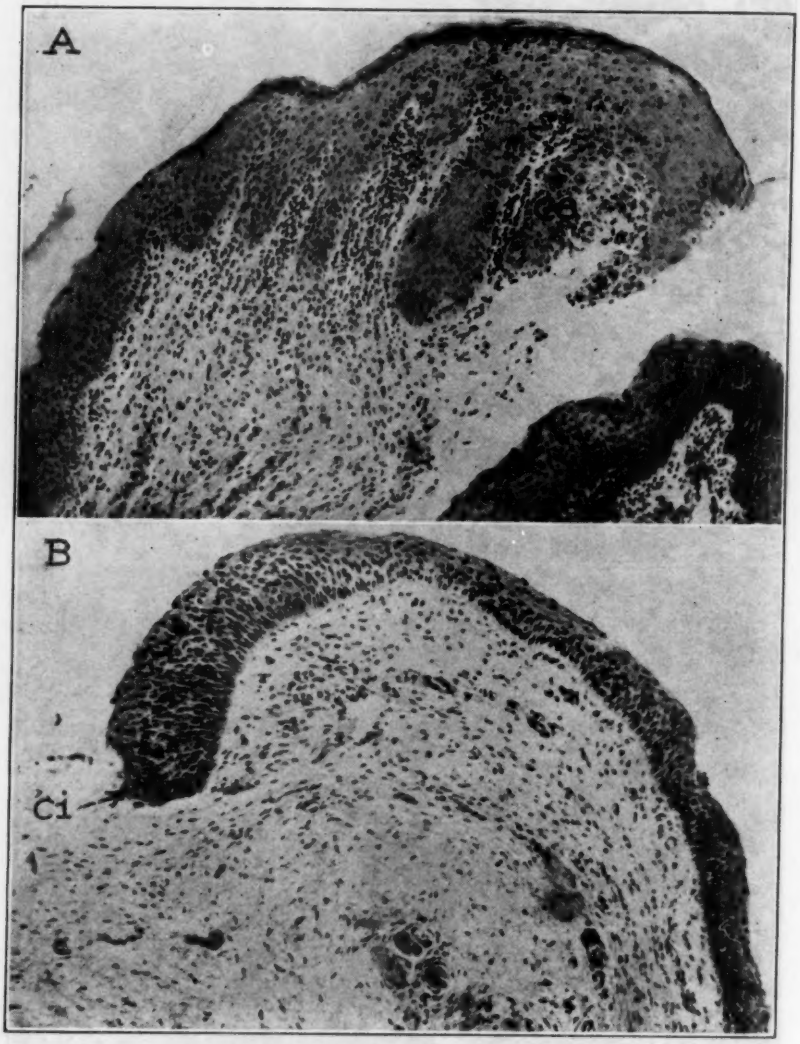


Fig. 7.—Postoperative biopsy specimen showing a residual lesion of the anterior portion of the right *A*, small area of squamous cell carcinoma at *ca*. *B*, cancer in situ at *ci*, passing rather suddenly into n stratified columnar epithelium.

mucosa as carcinoma in situ. This must be distinguished sharply from lymphatic permeation and direct invasion of mucosal tissue spaces.

SUMMARY AND CONCLUSIONS

This report concerns itself with the histologic study of a block of laryngeal tissue removed by thyrotomy. The lesion was grossly seen involving only the middle and anterior thirds of the length of the true cord tissue, there was no glottic or ventricular extension. The false was completely normal. The presence greater length of cancer in situ anterior t hornifying carcinoma and only a slight am posterior to it permits one to conclude tha lesion grew to the anterior commissure and tended to the opposite cord. This would to confirm previous clinical and histopath studies.

e lesion on the left cord had been well nvented by normal epithelium. That of the cord, however, showed incomplete removal, ugh grossly there could not be discerned pathologic alterations.

he need for further biopsy was clearly indi-, a later study disclosing residual malignant e in the larynx.

the absence of a serial study of the involved s, the residual malignant tissue would have permitted to invade further, with develop- of clinical signs of recurrence. The extent e growth may have been such as to indicate gectomy. However, delay has been avoided, and further laryngofissure should give a favorable prognosis.

It is noteworthy that a true picture of the laryngeal pathologic changes could not be determined from the original biopsy specimen, which showed a hornifying squamous cell lesion without carcinoma in situ.

This observation is in accord with the established fact that it is often difficult to make an accurate microscopic diagnosis from one portion of a tumor. An examination of serial sections of the entire mass is essential.

It is therefore sound to conclude that serial histologic study of laryngofissure specimens would prevent delay in the management of residual malignant neoplastic tissue.

MÉNIÈRE'S FAMOUS AUTOPSY AND ITS INTERPRETATION

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That Ménière's disease is due to hemorrhage into the labyrinth is a tenet still commonly held and widely taught. This teaching is based on a misinterpretation of Ménière's description of the autopsy in a single case which he published in his original paper, and the doctrine has led to great confusion of thought. It is in the hope of finally setting the record straight that this account of the famous but ill fated necropsy has been written.

On Jan. 8, 1861, at the Academy of Medicine in Paris, Ménière read his first paper on the condition which is now recognized under his name.[1] This paper was subsequently published in the *Gazette médicale de Paris* for September 21 of the same year,[2] and there, on page 598, will be found the account of the autopsy which has led to all the trouble. Translated, it reads thus:

I have spoken elsewhere, a long time ago, of a girl who, having journeyed by night, in winter, on the box seat of a stagecoach during the time of her catamenia, became, as a result of the severe cold,[3] completely and suddenly deaf. Admitted to the service of M. Chomel, she presented as the principal symptom continuous vertigo—the least effort at movement caused vomiting, and death took place on the fifth day. The autopsy showed that the brain, the cerebellum and the spinal cord were absolutely free from any change, but, as the patient had become completely deaf after having always heard perfectly, I removed the temporal bones in order to investigate thoroughly what could be the cause of this complete deafness which had come on so rapidly. The only lesion I could find was in the semicircular canals, which were filled with a red, plastic matter, a sort of bloody exudate, a few traces of which were discovered with difficulty in the vestibule and which did not exist at all in the cochlea. The most careful investigation allowed me to establish with all desirable precision that the semicircular canals were the only [part] of the labyrinth which showed an abnormal state; this consisted, as I have said, in the presence of a reddish, plastic lymph, replacing the liquid of Cor[ti]

To the "elsewhere" of which he speaks in the first sentence Ménière gave no reference. It was only after a long hunt that I discovered what "elsewhere" was, and then only to find, like Scott at the South Pole, that some one had been there before me. M'Kenzie[4] had gone through the same hunt, which he described in 1924 in a paper of which I was unaware at the time.

Some fifteen years before the publication of Ménière's paper, a book on diseases of the ear had been written by a German author, Kramer.[5] This work had been translated by Ménière, with notes and additions by him, and published in Paris in 1848.[6] On page 397 appears a translator's note, which, translated again, reads as follows:

I have seen a girl stricken with complete and absolute deafness in the short space of a few hours. Traveling by night in an open carriage, she was exposed to a considerable cold during the time of her period, and the hearing was lost without the ears ever having been the seat of pain. Death, which supervened soon after, gave me the opportunity to dissect carefully the temporal bones, and I found throughout the labyrinth a plastic, reddish lymph, which appeared to be the result of an exudation from all the membranous surfaces of the inner ear.

This case is presumably the one to which he refers in his paper of 1861; at least, I, like M'Kenzie, can find no other. It will be noted, however, that there are two great discrepancies between the two accounts, one in the symptoms and the other in the pathologic changes described.

First, as to the symptoms: In the earlier account, of 1848, there is no mention of the vertigo which is made so much of in the later one: ". . .continuous vertigo—the least effort at m[ovement]

From the Ear, Nose and Throat Service of the Third (New York University) Surgical Division, Bellevue Hospital, and the Department of Otorhinolaryngology, New York University College of Medicine.

1. Ménière, P.: Sur une forme de surdité grave dépendant d'une lésion de l'oreille interne, Bull. Acad. imp. de méd. **26**:241, 1860-1861.

2. Ménière, P.: Mémoire sur des lésions de l'oreille interne donnant lieu à des symptômes de congestion cérébrale apoplectiforme, Gaz. méd. de Paris **16**:597, 1861.

3. This phrase is usually translated "as *the* result of *a* severe cold." This is incorrect and conveys an entirely false impression. The French reads *"par suite d'un froid considérable,"* which means "as a result of the severely cold weather." It has nothing to do with a cold in the head, which in French is *un rhume,* not *un froid.*

4. M'Kenzie, D.: Ménière's Original Case, J. Lar[yng.] & Otol. **39**:446, 1924.

5. Mr. Edward Schiels, reference librarian at the New York Academy of Medicine, was indefatigable in his search for the Kramer reference and in M'Kenzie's paper for me.

6. Kramer, W.: Traité des maladies de l'or[eille] translated by P. Ménière, Paris, Germer-Baillière, 1[848]

caused vomiting." The reason for this pancy is difficult to assign. Certainly there thirteen years between the two writings, more than that between Ménière's seeing the nt and his second description. Was his ory at fault? It seems unlikely, since he always refer to his own note in Kramer's Or did he through carelessness omit any iption of vertigo in his first account? This impossible, for he was a fluent and prolific r and not very careful even of his grammar re was none of the French precision about ière's writing, though his clinical observation accurate enough. Or did he unconsciously oider fact to conform to theory; did he, mbering the pathologic findings in this case, fitted in so well with his idea, "remember" he vertigo? Whatever may be the explana- there is the fact—one account speaks of go, the other does not.

e second discrepancy is in the pathologic e mentioned. In the earlier account the ate is described as distributed "throughout labyrinth," whereas in the later one it is to have occupied the semicircular canals with "a few traces . . . discovered with dif- y in the vestibule" and none at all in the ea. Here, again, comes the question: Was ière's first account careless, was his memory y, or did his desire to enforce his conviction the lesion in the case he was describing was e semicircular canals lead him to stretch the nce? Even if the last is the explanation— I confess it is the one which seems to me plausible—it is no damning criticism of ière. Many an honest man has done the thing before and since. It is a human fail- to which even the integrity of the scientist t always immune, to try to fit facts into a ed pattern, even if they are not of exactly ight shape. It is one aspect of what, in the nce of the day, is called wishful thinking. t on one point, and that not the least im- ant, Ménière's two accounts are entirely istent, and that is in his description of the ents of the labyrinths. In the earlier account peaks of "plastic, reddish lymph . . . an exudation," and in the latter of "red, plastic matter, a sort of bloody exudate." But mark well, not blood. In no place does Ménière speak of blood in the labyrinth.

Whence, then, came the popular fallacy that Ménière attacks are the result of hemorrhage into the labyrinth? Probably it arose in this way: Hemorrhage into the labyrinth, massive hemorrhage which produces symptoms, does occur, and, though it is something of a rarity, a number of cases with autopsy have been reported. But there are two things to note about these cases—that in every reported instance the hemorrhage has occurred in the course of a blood disease, to wit leukemia, and nearly always shortly before death, whereas patients with Ménière's disease do not die of their attacks; and that in every recorded instance except one, that of Lannois,[7] (and I have read all the reports), there has been one attack, and one only, because the hemorrhage has destroyed entirely the affected labyrinth, whereas the distinguishing characteristic of Ménière attacks, without which, indeed, the diagnosis cannot with certainty be made, is their recurrence. In other words, hemorrhage into the labyrinth severe enough to produce symptoms takes place only in the course of leukemia, usually as a terminal event. If, then, in the course of leukemia a hemorrhage takes place into the labyrinth, is the diagnosis to be changed from leukemia to Ménière's disease? Of course not, yet that is in effect what is demanded.

It should be taught in the lecture rooms, it should be shouted from the medical housetops, that hemorrhage into the labyrinth is not the cause of Ménière's disease. When speakers utter the old heresy, as still, regrettably, they do, even those who should know better, they should be hunted from the rostrum; when a writer writes it, his editor should scratch it out with the reddest of red ink. Somehow or other this false doctrine must be finally expunged, for it impedes understanding.

127 East Seventieth Street.

7. Lannois, M.: Examen des rochers dans un cas de syndrome de Ménière, Lyon méd. **60**:23, 1889.

PLASMOCYTOMA OF TEMPORAL BONE

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HABANA, CUBA

Plasmocytomas of the temporal bone are extremely rare. In the extensive review of world medical literature I have found only 2 other cases reported. One was that of Cappell and Mathers,[1] who stated in 1934 that their case of plasmocytoma of the petrous bone, proved by necropsy, was the first reported. The second case was cited by Fowler [2] from Neumann, who described a case of an involvement of the petrous bone, but from the description it was difficult to determine whether the tumor spread throughout the petrous bone or was confined solely to the mastoid process.

These plasma cell tumors, or plasmocytomas, may be medullary, when they arise from the bone marrow, or extramedullary, when they develop from other sites, such as the nasal mucosa, conjunctiva, lymph nodes and ovaries. When a tumor arises either in the tonsil or in the humerus, it is not difficult to identify its source as medullary or extramedullary. However, if the growth occurs in the temporal bone, involving the middle ear, the mastoid process and the petrous apex, it is rather difficult to identify its source, since it may come from the mucosa of the nasal chambers, the eustachian tube, the lining of the middle ear and of the mastoid air cells or from the normal bone marrow.

REPORT OF A CASE

C. S., 67 years old, a well developed white woman, was seen for the first time in February 1944. Her symptoms had originated four years before with noticeable tinnitus and deafness in the left ear. These persisted until a year before I saw her, when she began to complain of pain running from the left eye to the left mastoid region. This was intensified at night, and in addition she complained of double vision on looking to the left. There was never any fever or dizziness. Otoscopic examination showed that there was a somewhat full pink ear drum with a complete loss of usual landmarks. There was no pain over the mastoid process. Paracentesis revealed nothing significant except excessive bleeding, which checked by the local application of 1 per cent so of Tuamine (2-aminoheptane) sulfate. Functional revealed normal hearing in the right ear but co deafness in the left ear. There was no response the left ear to the caloric test with 200 cc. of at 20 C.; the right ear gave a normal reaction wi cc. of water at 25 C. The postrotatory reflexes the two ears were similar, the reaction lasting tw five seconds. Neurologic examination revealed ralysis of the left fifth and sixth cranial nerves, abolition of the corneal reflexes of the left eye inability to turn the left eye to the left. The labor examinations showed normal urine, normal b chemistry and negative serologic reactions. There

Fig. 1.—*A*, paralysis of the left sixth cranial n The patient is looking to the left. *B*, after treat the patient is able to turn the eye to the left.

a mild secondary anemia, with 3,400,000 red b cells, 9,300 white blood cells, 51 per cent polymor clear leukocytes, 41 per cent lymphocytes, 6 per monocytes and 2 per cent eosinophils. The sp fluid was under slightly increased pressure. The a ysis showed 95 cells (97 per cent lymphocytes), Gm. of albumin, 73 mg. of dextrose and 479 mg chlorides. The Kahn reaction was negative.

The roentgenologic examination of the mastoid the Schueller position revealed a fine osteitis in region of the periantral cells. In the Stenvers posi there was observed normal large cell pneumatiza of the right petrous apex, while the left apex sho several zones of destruction of bone with an enla ment of the acoustic orifice. In the Hirtz posi no additional involvement was discernible.

My first impression was that I was dealing with infection of the middle ear and the mastoid and involvement of the petrous apex producing the comp Gradenigo syndrome. However, in view of the a sence of any acute toxic symptoms, of the norm blood count and of the slow progress of the sympto it was thought that there might be an intracra

This paper was read before publication and suggestions were made by Dr. A. H. Persky, Philadelphia.

1. Cappell, D. F., and Mathers, R. P.: Plasmocytoma of the Petrous Temporal Bone and Base of the Skull, J. Laryng. & Otol. **50**:340 (May) 1935.

2. Fowler, E. P.: Medicine of the Ear, New York, Thos. Nelson & Sons, 1944.

The neurosurgeon (Dr. Ramierz Corria) that in all probability it was a tumor, and in quence we decided to perform an exploratory idectomy. This was done on February 21. The n was found to be filled with a small mass of tissue, apparently coming from the aditus, which d to infiltrate into the bone. Cultures were and the tissue was submitted for histologic study. Chediak, who made the cultures, reported that showed no growth.

histologic study, according to Dr. Leon Blanco, ed sclerotic hypertrophic tissue from the mastoid with various areas showing a dense infiltration smocytes, a few lymphocytes and few dissemi- mononuclear leukocytes.

plasmocytes were more or less typical and they d for the greatest part spherical and eccentric seldom central, with the chromatin distributed

The bone substance showed necrosis in certain areas, but there was no evidence of cellular infiltration into the medullary spaces.

I felt that this was not primarily a true surgical case; consequently the patient was referred to a roentgenologist for high voltage roentgen therapy. From March 1 to 24, the patient received 5,700 r at 30 r per minute to the field at 8 by 9 cm. The area treated covered the entire petrous bone, the ear and the mastoid. The first course of treatment was stopped because of the pronounced reactions in the auricular cartilage. It is interesting to note that all ocular pain had disappeared but the paralysis of the external rectus muscle still persisted. The second course of treatment was given for seventeen days, from May 3 to May 20. The patient received 4,000 r at 18 r per minute to a somewhat more anterior field, so that the petrous bone itself could be irradiated. The external ear was carefully protected. At the termination of the second course of treatment there was evidence of movement of the left eye. This movement improved to the extent that there was only a slight strabismus in the extreme left position.

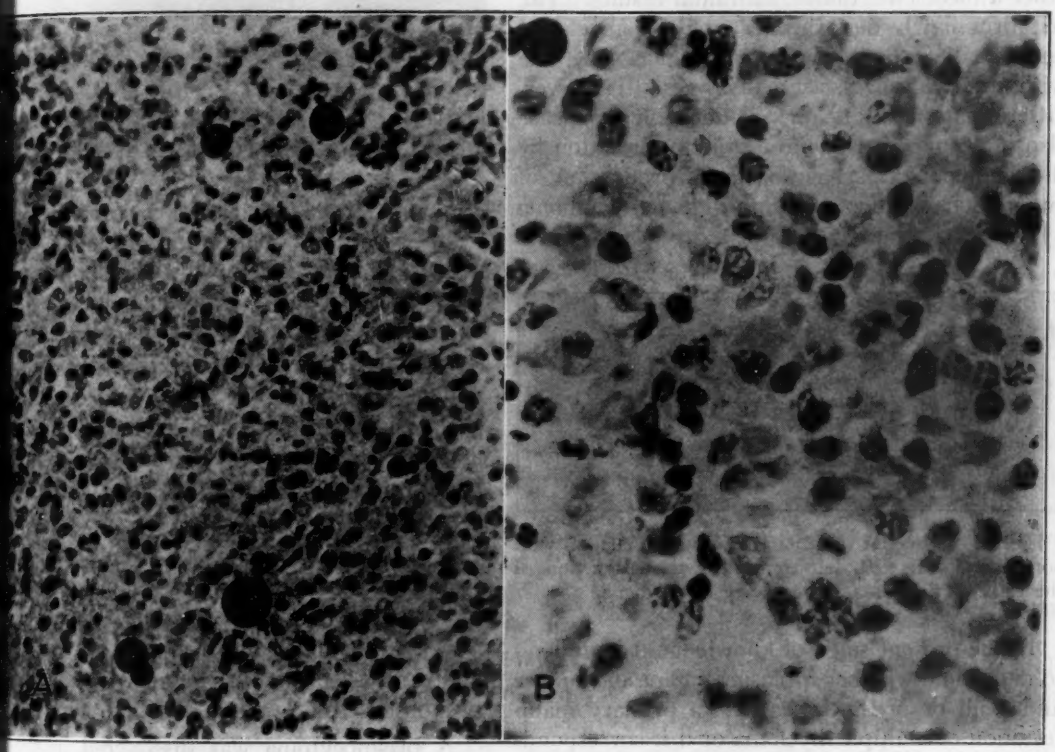

Fig. 2.—*A*, diffuse infiltration of plasmocytes; hyaline corpuscles so frequent in this type of tumor. *B*, phologic character of the cells; eccentric nucleus with abundant nuclear chromatin disposed in a cartwheel.

e perispheric particles, having a radial apnce. There was a homogeneous basophilic prosm with a pale semilunar halo adjacent to the us. The size varied; some cells were large, with gle nucleus, and other cells were multinuclear. e was also evidence of degeneration, with inclusion e protoplasm of the spherical bodies composed e hyaline acidophilic substance, which after the egration of the protoplasm remained free (Rus- bodies).

e lymphocytes appeared usually around the blood ls. A few cells showed mitosis. In certain the blood vessels showed zones of congestion numerous polymorphonuclear cells. One of the mens revealed, next to the mucosal lining, a it of remains of some hematinic cells with fusi- spaces occupied by dissolved cholesterol crystals.

COMMENT

Plasmocytic mastoiditis was described by Eagleton [3] as a metaplasia of the bone marrow originating in a suppuration of low virulence in the petrous apex and filling the mastoid process

3. Eagleton, W. P.: A New Classification of the Bones Forming the Skull, Arch. Otolaryng. **24**:158 (Aug.) 1936.

with plasmocytes. This classification apparently did not apply to my case, since there was no growth in the cultures and since there were definite morphologic differences between the plasmocytes present in the sections taken and the typical plasmocytes.

There is nothing more variable than the evolution of a plasmocytoma, and it is difficult to establish its prognosis. Claiborn and Ferris [4] admitted the existence of an acute and a benign form. Hellwig [5] established four clinical forms: two benign forms, which have a favorable evolution and which may be either single or multiple, and two malignant forms, one of which may be a solitary destructive progressive tumor and the other a metastatic tumor with fatal results. The last form may be described as a multiple myeloma, but in reality it is a true medullary plasmocytoma with multiple metastases to bones. However, differentiation is difficult, for in Kahler's disease also it is supposed that there is an alteration by the hemopoietic system with a production of either bone tumor or a malignant lymphoma (Jackson, Parker and Bethea [6]).

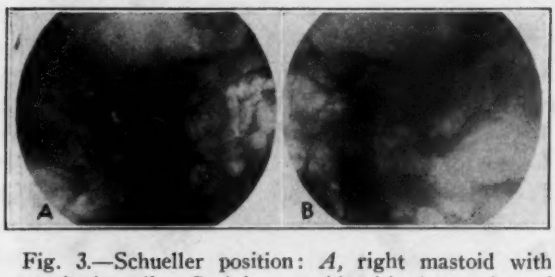

Fig. 3.—Schueller position: *A*, right mastoid with normal air cells; *B*, left mastoid with destruction of the cells. There is a large cavity in the bone.

In the present stage of knowledge it is difficult to determine whether a plasmocytoma of the face and skull or of the airways is a primary manifestation of multiple myeloma or if it corresponds to a solitary tumor. It is also impossible to determine whether the growth will remain be or become malignant. The absence of B Jones protein is not, according to New important factor, and it is interesting to that patients who may react in different do not show many great differences in the h pathologic examination. As in my case, different clinical forms have a plasmocyte predominant cell. Its size may vary, some being two or three times larger than normal more than one nucleus and mitosis. Mitosis not indicate malignancy, for in the 3 cases

Fig. 4.—Stenvers position: *A*, right side, wit air spaces; *B*, left side, with necrosis of the bon

ported by Hellwig [5] in which there was mi there was no recurrence after operation.

Because of this variable picture and bec of the fact that my patient has been treated only a short time, it is impossible to ma prognosis in this case. Jackson [6] reported a in which multiple myeloma (metastatic) occu eight years after the appearance of the soli plasmocytoma.

SUMMARY

A case characterized by a slowly progres Gradenigo symptom complex of four years' d tion, with tinnitus and deafness, trigeminal p and paralysis of the fifth and sixth cranial ner was observed.

A plasmocytoma was discovered in the t poral bone, involving the middle ear, the mas and the petrous apex. Only 2 other such c have been reported previously in the literat

There was a pronounced radiosensitivity this tumor to high voltage roentgen radiation

4. Claiborn, L. N., and Ferris, H. W.: Plasma Cell Tumors of Nasal and Nasopharyngeal Mucosa, Arch. Surg. **23**:477 (Sept.) 1931.

5. Hellwig, C. A.: Extramedullary Plasma-Cell Tumors as Observed in Various Locations, Arch. Path. **36**:95 (July) 1943.

6. Jackson, H., Jr., Parker, F., Jr., and Bethea, J. M.: Studies of Lymphoid and Myeloid Tissues: Plasmatocytomata and Their Relation to Multiple Myelomata, Am. J. M. Sc. **181**: 169 (Feb.) 1931.

7. New, G. B., and Harper, F. R.: Plasma Myeloma of the Pharynx and Cervical Region W out Skeletal Involvement, Arch. Otolaryng. (July) 1932.

RECONSTRUCTIVE TREATMENT OF GUNSHOT WOUND OF FACE AND NECK

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recent years a great deal has been written t battle injuries of the face. There have several publications and reports dealing emergency and early treatment of gunshot nds of the face. This paper is based on riences in a general hospital of the zone e interior, and consequently it will deal sively with the late treatment of such ies. It may therefore be considered as a nuation of the experience of medical installa- in the theater of operation.

is not the purpose of this paper to describe various standard reconstructive procedures, as rhinoplasty, blepharoplasty and cheilo-y, which are used frequently in treatment of hot wounds of the face; I shall rather dis- the problems which are fairly specific in management of this kind of battle injury and which the civilian physician may not be liar.

he majority of facial wounds are due to ments of bombs, mines or shells. Small s fire accounts for about 20 per cent of battle alties. The large fragments are responsible extensive destruction of tissue, and such nds are survived only when the impact is sted by the facial skeleton, which prevents missile from damaging vital structures. A t number of injuries are due to relatively ll fragments. This kind of injury is fre-ntly multiple and not limited to the head but bined with wounds of the trunk and emities.

hen a high velocity projectile with a smooth ace strikes soft tissues, it will pass through tissue causing little damage, unless it happens injure vital organs, like the eyes. Both entrance and the exit wound will be ll with sharp edges and ordinarily will readily. A projectile with ragged es is apt to cause more damage by rating the structures it traverses. The same of damage occurs when the projectile per-tes relatively thin bone, like the nasal and antral walls, if the tissue is not dense enough to decrease essentially the velocity of the missile. However, when dense bone, like the mandible, is encountered, the projectile is slowed in its course and causes extensive splintering, the splinters acting then as secondary projectiles. In its further course, the destruction is a result of the combined impact of the primary and secondary projectiles. In such cases, the exit wound will be many times the size of the entrance wound and will show extensive destruction. Furthermore, the disorganization of the deep tissues and the presence of many devitalized fragments will prevent primary healing and will invite infection.

Radical débridement is not recommended in the early care of wounds of the face because of the excellent vascularity of the facial tissues and their ability to resist infection. Gas gangrene is practically unknown in facial injuries. Experience in this war has emphasized the wisdom of conservatism and preservation of tissues in the early care of facial wounds. Frequently the preservation of seemingly insignificant fragments of skin or bone will considerably simplify the treatment of the injury and will assure a better end result.

When the soft tissues are divided, they have a strong tendency to retract, thus simulating a much more extensive loss of tissue than actually occurs. During the subsequent healing and contracture of the granulating tissue, considerable distortion will occur, which, in turn, exaggerates the deformity.

The factors in early care which have essentially assisted in the reconstructive treatment of gunshot wounds of the face are (1) preservation of tissue; (2) fixation of the bony fragments in functional position, and (3) avoidance of distortion of soft tissues, prevention of contractures and excessive fibrosis (i. e. through early temporary skin grafting).

However, all these factors are secondary, since the paramount effort in early care must be directed to the saving of life. All the patients on their admission to the hospital were in relatively good general condition and well beyond danger to life, but many of them had been in a

All dental and prosthetic work was done by Cap- W. D. McCarthy, Dental Corps, Army of the ted States.

critical condition at the time of their injury, as evidenced by the fact that almost 30 per cent of them had had emergency tracheotomies.

A characteristic of gunshot wounds of the face is that they combine damage to soft tissues with comminuted compound fractures of the facial bones. The result is frequently a complicated facial deformity which can be traced to injury of three facial structures: skin and subcutaneous tissue, mucous membrane and skeleton.

As a general principle in the correction of cutaneous defects, every effort is made to avoid taking skin from a distance. Free skin grafts or flaps from the trunk or upper extremities seldom if ever blend with the facial skin. The retroauricular free skin graft is an exception and is used frequently for correction of small defects around the eyes and nose. Flaps from the cheeks are useful in repair of defects around the mouth. Skin from the neck is utilized frequently either in the form of tubed flaps or sliding flaps and provides a good match for the hair-bearing facial skin (fig. 1). Loss of skin on the neck results in heavy cicatricial contractures, which limit the movements of the head. With the use of multiple flaps from the surrounding cervical or upper thoracic region, it is feasible to resurface surprisingly large defects. Split skin grafts may also be used. Although they take well, particularly in the lateral region of the neck, they are always the second choice.

An important subcutaneous structure which occupies considerable space in the lateral region of the face is the parotid gland with its
It is frequently involved in gunshot wou
this location, and, as a result, external sa
fistulas are not uncommon. However, the
of the gland itself ordinarily will heal spon
ously after the corresponding portion of the
undergoes fibrosis resulting from chronic
tion. Roentgen irradiation of the parotid
may hasten this process and help dry u
fistula. Should the fistula originate
Stensen duct, it will be conspicuous at fir
reason of the copious discharge of clear
The amount of secretion diminishes in
though the fistula persists and requires su
correction. A simple and effective proc
is the dissection of the fistulous tract

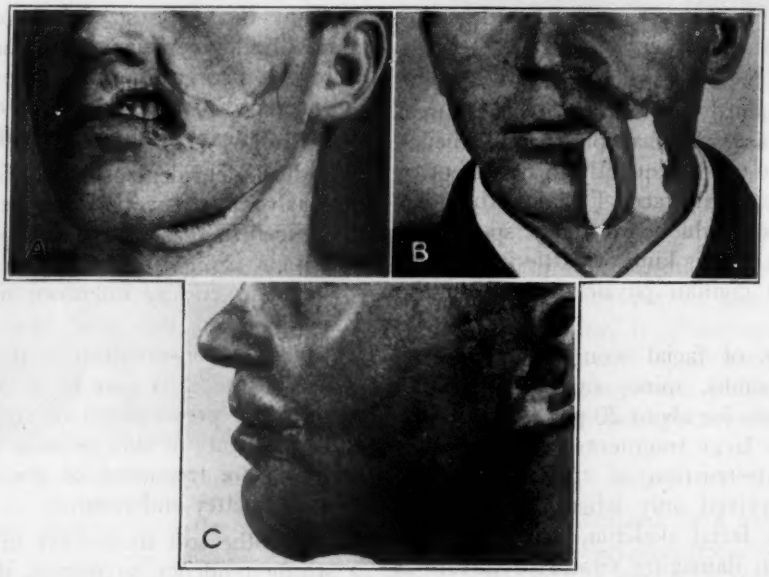

Fig. 1.—*A*, loss of the left half of the upper lip. Scarring of the cheek precludes the use of any cheek
Use of a horizontal neck flap was delayed. The carrier portion of the flap was tubed. *B*, flap transfer
lip. Scar tissue on the lip was reflected toward the mouth to serve as a lining. *C*, mucous membran
from lower lip transferred to upper lip to form the mucocutaneous border of the reconstructed lip.

distance of about 2 cm. and the insertion o
mobilized portion of the tract into the
through a stab incision in the mucous membr
It is then anchored to the edges of the inci
The distal portion of the Stensen duct is
interfered with and remains obliterated by
contractures (fig. 2).

Gunshot wounds of the face may involve
mucous membrane in all three facial cav
oral, orbital and nasal. The destruction o
mucous membrane in the mouth always re
from lacerations of the whole thickness o
cheek or lip and is frequently associated
fractures of the mandible or maxilla. In
of extensive loss, the oral mucous mem

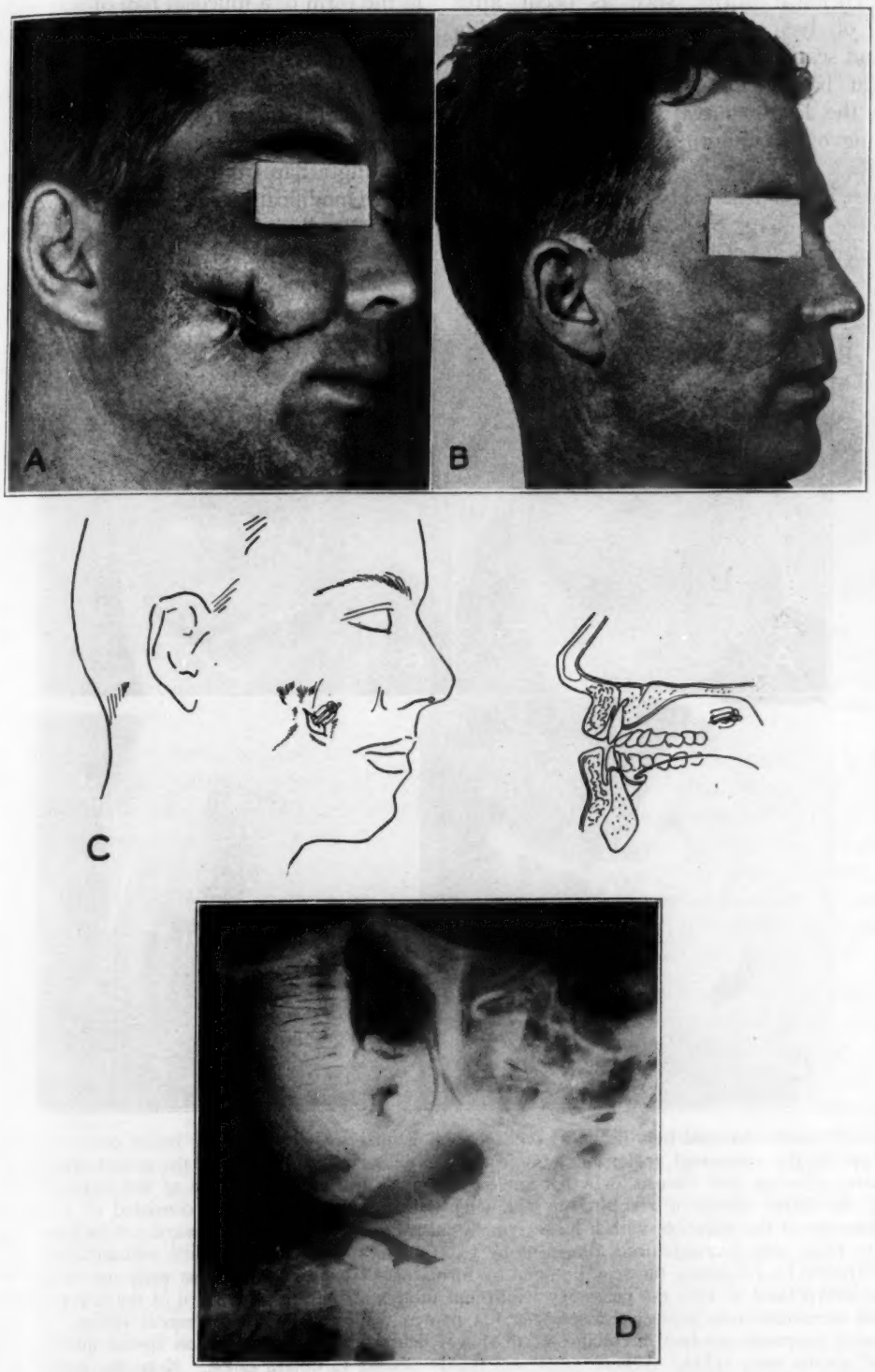

Fig. 2.—*A*, a rifle bullet penetrated the left cheek, fractured the right upper alveolar process and floor of maxillary sinus and emerged through the right cheek. The wound of entry was small, healing with an inconspicuous scar. Because of bony damage, the wound of external fracture was extensive and healed with marked deformity. Stensen's duct was involved, and there was a salivary fistula at the bottom of the depression. The fistula was eliminated when the deformity was revised. *C*, diagrammatic presentation of the procedure described in text. *D*, roentgenologic visualization of the fistula after injection of iodized poppyseed oil, showing course of Stensen's duct.

heals readily, but heavy fibrotic scar strings develop. They resemble closely the sequelae of intraoral chemical burns, such as occur after ingestion of lye, except that the underlying fibrosis and scarring are deeper and more extensive. Scar bands running vertically from the upper to the lower buccal sulcus will restrict the opening of the mouth and may distort and fix the lips. Scarring in the upper and lower buccal sulci leads to their obliteration and makes it impossible to fit the patient with a satisfactory denture. Intraoral scarring may require surgical attention preliminary to other surgical procedures, since it renders difficult any approach to the oral cavity.

The mere division of these scar bands is futile and only increases the amount of scarring. It is necessary to replace the lost mucous membrane with an epithelial cover. This can be done either in the form of a mucosal flap or a free skin graft. Wherever possible, the former is to be preferred, not only because it offers a more natural replacement but because it simplifies the after care. If the intraoral scarring is confined to a limited area; it can readily be corrected by interpolating a flap from the adjoining mucosa, with some modification of the Z plastic procedure. Occasionally when a portion of the lip has to be removed because of external and deep scarring it may be possible to save the mucous membrane and utilize it for correction of the obliterated lower sulcus (fig. 3).

When the cicatricial contractures in the mouth are extensive, an epithelial inlay is indicated

Fig. 3.—*A*, soldier injured by rifle bullet while crawling on his abdomen. The bullet penetrated the upper lip and emerged in the submental region. The soft tissue injury consisted of loss of the middle segment of the lower lip, extensive scarring and fibrosis of a portion of the lower lip and obliteration of the lower buccal sulcus with adhesions, the latter condition resulting in annoying drooling. Bony damage consisted of a compound comminuted fracture of the mandible with a large symphysial fragment displaced downward and backward. *B*, previous attempts to bring this fragment into alinement by external fixation led to increased sequestration. *C*, the upper lip was corrected by reopening the scar line and by formation of triangular flaps on each side of the defect. These flaps were interpolated to give the necessary width and fulness of the lip. One third of the lower lip was resected but mucous membrane was preserved and used as a flap to resurface the lower buccal sulcus. *D*, displacement of the central fragment resulted in collapse of the lower dental arch. The arch was spread and immobilized with a sectional acrylic resin splint. A bone graft was finally needed to obtain union. Note the outline of the osteoperiosteal graft along the buccal surface of the mandible. A similar graft, though shorter, was placed along the lingual surface, and the defect between fragments on the left side was filled with bone chips.

skin grafting inside the mouth requires
ite provision for fixation of the grafts and
ged and watchful after-care to minimize the
ctural tendency of the graft. After excision
mucosal scar and the submucosal fibrotic
(care being taken not to injure the Stensen
an impression of the defect is made with
compound (Stent's mass) and a fairly
kin graft (cut with a Thiersch knife or
dermatome) and is glued to the mold with
cement (supplied with the Padgett
tome). This mold may then be sutured
he cavity or fixed in place by means of a
appliance. A voluminous dressing is
d to the face to provide external pressure
elp in the fixation of the graft.

the first dressing, on the fifth to the seventh
or shortly thereafter, the Stent mold is
ced by an acrylic resin splint attached to a
re or some other dental fixation device.
splint can be removed daily for cleansing
oses and must be worn for several weeks
nths until the graft passes its contractural
In 1 case in which the whole upper buccal
s was to be reestablished, the Stent mold
uilt on a dental tray rigidly suspended from
ster of paris head cap, in the manner of a
sley splint.

ss of nasal mucosa leads to obstruction of
asal cavities. This usually occurs in the
ior portion of the nose or in the vestibulum.
floor of the vestibulum is a frequent site of
icial obstruction, which may be associated
an oronasal fistula. This can be corrected
a small cheek flap which follows the outline
e base of the ala (fig. 4). Occasionally a

. 4.—Diagrammatic presentation of a small cheek
or resurfacing floor of nostril.

l intranasal flap on the inside of the nostril
be sufficient to correct a mild obstruction.
vever, as a rule, resort has been had to
rsch grafts to provide a substitute for the
ing mucous membrane. After the scar tissue
issected and excised, a Stent mold of the
xtended nasal cavity is made. The graft is
rted glued to a finger cot, which is then
ed tightly with petrolatum gauze. The
t mold is used for construction of its replica
crylic resin. At the time of the first dressing
the finger cot is replaced with an intranasal acrylic resin splint which keeps the cavity overextended for several weeks. A breathing channel can be made in the splint for the patient's comfort, and the patient can remove and insert the splint without assistance (fig. 5).

Fig. 5.—Intranasal acrylic resin splint illustrated. Note the breathing channel and the metal handle, which facilitates the insertion and removal of splint. Upper part of rule is metric; lower part is in inches.

In the preparation of the orbit for a fitting of an artificial eye, epithelial inlays play an important role. It is not necessary for the eye socket to be completely obliterated by scar tissue to render it useless. Frequently some painful scarring on the posterior surface of the socket or a shallowness of the fornix will make the wearing of an artificial eye impossible.

Unless there is an excess of conjunctiva, any attempt to utilize conjunctival flaps is inadvisable, since it causes additional scarring. I excise the scar tissue and cover the defect with a Thiersch graft. Molds of Stent's mass are used for insertion of the grafts but are reproduced in acrylic resin at the first opportunity.

A projectile penetrating the face will invariably encounter a bony structure. Compound comminuted fractures of the mandible are commonly observed in gunshot wounds of the face. Extensive comminution and devitalization of fragments lead to infection and persistent drainage. This, in turn, delays or prevents union. An external sinus, an intraoral one or both may be present. Experience has shown that no chemotherapy, administration of sulfanilamide or penicillin, will permanently control the infection until the devitalized tissue is eliminated. Inadequate immobilization of the fragments supports the

infection, increases inflammation and causes pain. Fixation of the fragments takes preference over any other treatment. This is the tedious and responsible job of the dental member of the maxillofacial team. Frequently a considerable amount of work is necessary before the jaws are ready for splinting. Roots must be removed, teeth ground or filled and impressions taken. The ingenuity of the dental officer is heavily taxed in many cases to utilize the few remaining teeth to the best advantage. Functional occlusion and not union of the fractured bone is the primary consideration in resetting the displaced fragments. In alining the fragments in functional position my associates and I have not used an osteotomy or any other forcible means but rely chiefly on intermaxillary elastic traction, combined in rare instances with external traction. This has proved to be satisfactory, and functional occlusion has usually been obtained in a short time. Since fixation had to be maintained for several months, wiring was not suitable, and in most cases there were not enough teeth to make the wiring effective. Cast metal splints or splints of acrylic resin have proved to be the most satisfactory ones for this purpose and are comfortable to the patient, since they permit opening of the mouth. External fixation in the form of a Roger Anderson apparatus or a horizontal pin fixation has not been used. This form of fixation was considered inadequate for long term immobilization.

Drainage may continue for months but can be hastened by excision of the sinus tract and curettement of the fracture site. The wound is then packed, and if all the devitalized fragments are removed it usually heals in two to three weeks.

The progress of the fracture is followed by roentgen ray examination at regular intervals. It is surprising to observe how often when there is firm fixation and absence of infection small fragments unite and reestablish the continuity of the mandible. This continuity may involve only part of the thickness of the mandible. Often the fragments fuse only along the lower border of the mandible, the rest of the defect being filled with fibrous tissue. As soon as there is clinical evidence of bony union, the splint is discarded and the patient is allowed to masticate gradually under careful supervision. Functional use of the jaw makes for development of a heavier callus.

When fibrous union is established and the fragments are in fair approximation, excision of the fibrous tissue between the fragments and freshening of the bony margins will stimulate ossification. This simple procedure may [illegible] the necessity of a bone graft.

Persistent nonunion or wide separation [illegible] fragments calls for a bone graft. Fixation [illegible] functional position and freedom from infec[illegible] for several months are the prerequisites for [illegible] grafting. It is advisable to complete repai[illegible] the soft tissues around the fracture prelimi[illegible] to the bone grafting in order that the graft c[illegible] covered with vascular tissue and primary hea[illegible] assured. Both osteoperiosteal grafts from [illegible] tibia and block grafts from the ilium may [illegible] successfully used. If the bony defect is s[illegible] multiple osteoperiosteal grafts offer a sim[illegible] procedure.

Fractures of the maxilla may involve the to[illegible] bearing portion or the maxillary compound it[illegible] Defects in the alveolus are corrected by repla[illegible] ment with a denture. The necessity of [illegible] adequate buccal sulcus has been previo[illegible] emphasized.

Repositioning of displaced fragments in f[illegible] tures of the anterior facial wall, floor of the o[illegible] or malar bone is not feasible when delayed [illegible] several months after the trauma. We rely [illegible] bony, cartilaginous or dermal implants to cor[illegible] the depressions and reestablish facial symme[illegible] Preserved cadaver cartilage [1] is a satisfact[illegible] material for implantation.

Comminuted fractures of the maxillary si[illegible] are seen rather frequently. The majority of th[illegible] heal uneventfully and can be recognized at a la[illegible] date only by roentgenologic evidence. La[illegible] hematomas and lacerations of the mucosa h[illegible] readily as long as a healthy sinus is involv[illegible] An oroantral fistula is usually a result of so[illegible] osteomyelitic process in the sinus wall. Th[illegible] osteomyelitic foci frequently center around [illegible] foreign body, such as a wire ligature, which w[illegible] used in the early treatment to fix displaced fra[illegible] ments. In such cases a Caldwell-Luc proced[illegible] is indicated and may require the removal of [illegible] good portion of the anterior and lateral sin[illegible] wall. The success of the procedure depends [illegible] the thoroughness of removal of the diseased bo[illegible] and closure of the oral wound with healt[illegible] mucous membrane. Scar tissue may eas[illegible] break down, causing recurrence of the fistula.

SUMMARY

In spite of thorough early treatment, gunsh[illegible] wounds of the face often result in extensi[illegible] facial deformities, which may involve all t[illegible] facial structures. The rehabilitation of the

1. O'Connor, G. B., and Pierce, S. W.: Refrig[illegible] ated Cartilage Isografts, Surg., Gynec. & Obst. [illegible] 796, 1938.

ies may require correction of external facial rmities, replacement of mucous membrane treatment of compound comminuted fracs of the facial skeleton. In the correction xternal facial deformities, the best cosmetic lt can be obtained by utilizing the available of the face and neck. Epithelial inlays are uently resorted to in replacing the missing ous membrane with skin grafts.

In the treatment of compound and comminuted fractures of the mandible, fixation in functional position is of primary importance. Persistent drainage is due to the presence of sequestrums and will cease when they are removed. If spontaneous union does not occur, bone grafting is indicated. Preserved cartilage is satisfactory material for correction of contour defects of the face.

DIAGNOSIS AND TREATMENT OF NONSUPPURATIVE SINUSITIS

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I want to state in the beginning that this report has nothing whatever to do with empyema of the sinuses, for which surgical and other types of treatment are well established.

The reason for this investigation was that the sinus troubles of many patients could not be explained on the basis of infection, deformity or new growth.

The symptoms of nonsuppurative sinusitis are as follows:

1. Postnasal discharge of a mucoid type without empyema of the sinuses.
2. Sensation of nasal obstruction or stuffiness without actual mechanical obstruction.
3. Pain or headache referable to the sinuses without clinical or roentgenographic evidence of suppuration of the sinuses.
4. Fatigue without obvious organic physical findings.
5. Neuritis in various parts of the body, especially suprascapular.
6. Allergic manifestations.

These and many other symptoms, such as aural neuritis without discoverable cause and nervous symptoms, psychoneurotic in type, without positive findings, are frequently present.

This report is based on observation of more than 4,000 patients over a period of eight years.

PATHOLOGY

From the point of view of pathology, the involvement of the sinuses can be likened to suppurative pansinusitis except that mucus is found throughout all the cells instead of pus.

In my opinion, there is disturbance of balance in the colloids of the body. Coagulation is dominant over peptization. When the two are in balance, plasma reaches the blood stream through the fine arterioles, and the mucous membranes of the nose and sinuses are free from mucus and gelatinous material. When an imbalance exists, with coagulation dominant, there is a circulatory block, and lymph escapes through the mucous membranes, producing mucoid sinusitus and formation of gelatinous matter in the nasopharynx.

SYMPTOMATOLOGY

The postnasal discharge is the most com symptom. It causes much clearing of the th cough, a sensation of fulness and sometime tual choking sensations. Direct examin shows a mucoid secretion in the postnasal s Anterior rhinoscopy shows mucous bridges f the septum to the lateral wall.

The nasal fulness or obstruction frequ alternates from side to side and is worse whe patient is lying down and in the early mor Again, direct examination shows excessive m Frequently, although there is a septal devi to one side causing some obstruction, the pa complains that his worst difficulty in brea is on the opposite side where there is a concavity with only mucus present.

Essentially the same observations may made with regard to the sinus pain; i. e., the may be worse on one side but the septal obst tion is on the other side.

Fatigue has been present to some degre 87 per cent of the adult patients with chr trouble who consult me, and some degree of haustion, in 50 per cent. One cannot ignore voluntary statement of fact by the patients. T are not the so-called underprivileged; they h not been denied medical attention because o economic status, but medical treatment has b ineffectual because of lack of organic findi Such patients arrive in the consulting ro because of these sinal symptoms. They go away unaided unless otolaryngologists fo a definite pattern of investigation to estab the correct diagnosis. They will not be he unless they are given definite advice and adeq treatment over a period long enough to de mine the end result.

The neuritis, occipital and suprascapular type, was first demonstrated to me perso and in writings by Mithoefer. It can be dem strated by firm pressure starting with the occ tal attachment of the muscles of the neck going downward over the top of the shoul Nearly every patient with this syndrome wi least flinch; some may cry out in pain.

Mithoefer attributed this finding at t time to gastrointestinal disturbances and co

Presented before the American Academy of Ophthalmology and Otolaryngology, in Chicago, Oct. 10, 1944, under the title "A New Sinus Syndrome."

n. My observations are only a continuance is teachings with elaborations. We used ll symptoms of this type "posterior sinus symptoms," especially when occipital was present, as it usually is.

llergic manifestations (especially physical perennial), while not always present in this rome, do occur so frequently that consider- of them cannot be omitted in this discus-

While I recognize that specific desensi- ion is the scientific approach to allergy, in experience there have been so many failures other conditions must be investigated. Fre- tly, the patient may be desensitized this year half dozen foods and pollens for which he has positive reactions only to return the next year positive reactions to as many more. This ld lead one to suspect, at least, that body istry, physiology and metabolism are funda- tal factors which require consideration. amine desensitization is definitely indicated.

MANAGEMENT OF THE PATIENT

anagement of the patient with this syn- ne begins with the following procedures:

One forgets that one is a specialist with arrow vision through various specula and embers that one is first of all a physician.

One views the patient in his entirety.

One prepares to investigate the nutrition having the patient fill out and sign a dietary ory blank without suggestions or prompting.

A personal history of his habits, such as ing, resort to cathartics, smoking, consump- of alcoholic liquors and allergic reactions, aken.

One observes his autonomic nervous sys- —to determine whether the sympathetic di- on is dominant or the parasympathetic, or ether it is a well balanced normal system.

Glandular deficiencies or overactivities are ed.

The condition of the teeth, dental caries the dental arches are considered.

Symptoms psychoneurotic in type are lied.

Starting with the first procedure, one must r in mind that neither the internist nor the ily physician is interested in, and does not fess competence to treat, patients with sinus ease.

After eight years of experience in the man- ment of patients with this syndrome I know ereof I speak as far as the internist is con- ned. He is interested only in the results ich otolaryngologists get. He has no objection whatever to allowing them to take complete charge by whatever methods they deem necessary to accomplish the results.

I have diagnosed many cases of subclinical pellagra and had the diagnosis confirmed. Subclinical pellagrins are in the consulting rooms of all otolaryngologists.

Field, Parnall and Robinson,[1] stated:

> Pellagra is not confined to those two groups, alcoholic addicts and the Southern poor, whose dietary habits are notoriously bad and among whom the severe manifestations of the disease are especially common. Lesser deficiencies, not accompanied by florid dermatitis, diarrhea or dementia, are common in the average Northern population. They are the cause of important impairment of health.
>
> Many have commented on the decreased vitamin content of the modern American diet, due to an increasing consumption of sugar and refined flour, with an ensuing decreased consumption of vitamin-containing foods. . . .
>
> Many of our patients have had access to but have not selected an adequate diet. . . . People with poor appetities tend to select high-carbohydrate foods of low vitamin content.
>
> It is unfortunate that most of the descriptions of pellagra have emphasized the severe forms of the disease . . . patients without the fully developed picture actually constitute a majority of pellagrins.

Second, one views the patient in his entirety. One notes the color and the condition of his skin and whether his hair is thick or thin, or whether he is bald or partly bald. Is he the hypertensive type? Is he highly nervous or calm and phlegmatic?

The clinical observer can make a fairly accurate appraisal of all these conditions during the history taking. These observations should be backed up with a few laboratory procedures.

Third, nutrition—never depend on a patient's statement that he eats a well balanced diet. Of course, he thinks he does or he would have changed. There must be a written dietary history, made on a regular blank which the patient takes home and fills out carefully. A dietary history blank which includes all the different classes of food commonly consumed in this country is shown in figure 1. As mentioned, this blank must be taken home and studied carefully. If filled out amid the turmoil of the office it will be so inaccurate that it will be of no value.

There are those who argue that the average American diet is ample. I will agree that ample food is available even under rationing and at modest cost in grocery stores and in fruit and vegetable markets. Ample food is not found in the bakery, the candy shop or the drugstore.

1. Field, H., Jr.; Parnall, C., Jr., and Robinson, W. D.: Pellagra in Average Population of the Northern States, New England J. Med. **223**:307 (Aug. 29) 1940.

The "no breakfast" habit of many girls and women, the drugstore luncheonette and the provender obtained on a hurried trip to the bake shop on the way home are not "ample." It is no wonder that this is a nation with sinus disease.

DIETARY HISTORY

Approximately how many *each week* of the following articles of food do you consume? When possible, put *figures* in blank spaces. If a food is taken only occasionally, write *OCC.* in the blank space after the food. If a food is taken only in season, write *season* in the blank space after the food. If a food is not taken, write *none* in the blank space after the food.

1. Glasses of sweet milk....., Glasses of buttermilk....., Servings of cheese....., Ice cream.....

2. Eggs....., Strips of bacon....., Servings of meat....., Servings of fowl....., Servings of fish.....

3. Servings or portions of pie....., Cake....., Candy ....., Cookies....., Cereals....., Doughnuts....., Pan Cakes....., Waffles....., Crackers....., Macaroni....., Rice....., Spaghetti....., Other desserts most commonly eaten .....

4. Servings of vegetables: White Potatoes....., Sweet Potatoes....., Carrots....., Beans (dried)....., Corn..... Pumpkin....., Squash....., Spinach....., Lettuce....., Celery....., String Beans....., Green Peas....., Chard ....., Broccoli....., Cauliflower....., Asparagus....., Cabbage....., Brussels Sprouts....., Onions....., Tomatoes ....., Radishes.....

5. Servings of fruit: Oranges....., Grapefruit....., Pineapple....., Apples....., Bananas....., Prunes....., Dates....., Raisins....., Figs....., Melons....., Strawberries....., Cherries....., Grapes....., Fresh Peaches ....., Fresh Pears....., Apricots....., Apple Sauce....., Canned fruits kinds.....

6. Peanuts....., Peanut Butter....., Pecans....., Walnuts....., Almonds.....

7. Marmalade....., Jam....., Sweet Pickles....., Sour Pickles....., Honey

8. Glasses of Coca-Cola....., Bottles of soda pop..... Glasses of ginger ale....., Glasses of orange juice....., Grapefruit juice....., Pineapple juice....., Apple juice....., Lemonade....., Grape juice....., Cranberry juice....., Tomato juice....., Other soda fountain drinks.....

PER DAY—HOW MANY?

1. Portions of butter (½ inch × 1 inch × 1 inch).....

2. Portions of white bread (portion is one slice of bread, one roll, etc.)....., Portions of whole wheat bread....., Portions of rye bread....., Portions of corn meal bread....., Portions of oatmeal bread....., Portions of soy bean bread.....

3. Glasses of water....., of alcoholic beverage.....

4. Cups of coffee....., Caffee Hag....., Sanka Coffee ....., Postum....., Ovaltine.....

5. Cups of tea.....

6. Do you use table salt sparingly....., freely....., moderately.....

7. Do you use pepper sparingly....., freely....., moderately.....

8. Do you use vinegar sparingly....., freely....., moderately.....

9. If you add white sugar to tea, coffee or other foods at the table, how many teaspoonfuls each day.....?

10. Is this your average diet for the past three or four years .....?

11. What foods, if any, disagree with you.....
.....

12. Fond of meats? Yes, No. Fats? Yes, No. Sweets? Yes, No. Vegetables? Yes, No. Bread? Yes. No.

Name.....
Please Sign

Fig. 1.—A dietary history blank to be filled out at home by the patient.

Fourth, the procedures of taking the personal history: Again, this must be recorded by the patient on a special blank (fig. 2). Here the patient is allowed to tell his story unhurried and unafraid—unhurried because he does it at home; unafraid because the questions are asked and he will not be accused of being psycho-

PERSONAL REPORT

In answering questions draw a line through the YES or NO does not represent the correct answer. If you wish the a to read YES, draw a line through NO.

Do you sleep well? (yes-no) how many hours generally?....
Do you have difficulty getting to sleep? (yes-no)
Do you tire easily? (yes-no) Do you have a sense of e tion? (yes-no)
Do you smoke? (yes-no) How many each day? Cigara... Cigarets....., Pipe.....
Do you ever take medicine for your bowels? (yes-no) How often?....., What do you usually take?....
Do you have gas or burp after eating? (yes-no)
Are you subject to nausea or vomiting? (yes-no)
Are you subject to headaches? (yes-no)
Do you have sinus trouble? (yes-no)
Do you have difficulty breathing through your nose? (y Wheezing? (yes-no)
Are you ever dizzy? (yes-no)
Have you any hearing impairment? (yes-no)
Do you have noises in your ears? (yes-no)
Discharging ears? (yes-no)
Do bright lights hurt your eyes? (yes-no)
Does your hair fall out faster than it should? (yes-no)
Do you have much sneezing? (yes-no) Do you have hay f (yes-no) Allergy? (yes-no) Hives? (yes-no)
Does your skin itch? (yes-no) Ears? (yes-no) Nose? (y
Is your skin dry or moist?.....
Do you take cold easily? (yes-no)
Do you have sore throat often? (yes-no)
Do you clear your throat often? (yes-no)
Do you have an unpleasant taste in your mouth? (yes n
Do you have bad breath? (yes-no)
Do you have dropping in your throat? (yes-no)
Do you have a choking sensation in your throat? (yes-no)
Do your teeth decay easily? (yes-no) Do your gums bleed they are brushed? (yes-no)
Are you short of breath on mild exertion? (yes-no)
Do you have rheumatism? (yes-no) Neuritis? (yes-no)
Do you have muscle cramps any place in body? (yes-no)
Is your appetite good? (yes-no) Do you eat between mea at bedtime? (yes-no) Are you afraid of certain fo (yes-no)
Do you crave sweets? (yes-no) Sour foods? (yes-no)
Have you ever had ulcer of stomach? (yes-no)
Do you have colitis? (yes-no)
Do you ever have pain or tight feeling in your chest or a region of your heart? (yes-no)
Do you have any heart symptoms? (yes-no)
Do your finger nails bend, break or tear? (yes-no)
Do your hands and feet go to sleep easily? (yes-no)
Have you recently lost weight? (yes-no) Gained? (yes-no)
What is your present weight?.....
Has there been diabetes, tuberculosis or cancer in your fa name which.....
How many times do you pass water during the day?..... During night?.....
Do your lower limbs ever swell? (yes-no)
Do your eyes burn or feel tired after moderate use? (ye
Are you nervous? (yes-no) Difficult to relax? (yes-no)
Have you ever had a nervous breakdown? (yes-no)
Are you tense or high strung? (yes-no)
During cold weather do you sleep with the window open at n (yes-no)
Do you perspire freely? (yes-no)
What serious diseases have you had?.....
.....
What operations?.....
.....
Are you taking any vitamin now? (yes-no)
Are you taking any other medicine? (yes-no)
What symptoms do you consider most important in your
.....
Name .....
Please sign

DO NOT FILL OUT SPACE BELOW

T.....P.....R.....	Date	Date	Date
B W / P t	B / P		
B	Wt.		

Remarks .....

Fig. 2.—A personal history blank to be filled out home by the patient.

tic if he answers them accurately and in

much information of real value is gained
e two blanks shown that I could not prac-
nedicine without them. Before starting to
nese blanks I thought I took a satisfactory
y, but when I look over some of the old
ds I hide my head in shame at the many
s I missed.

olaryngologists are sometimes referred to
T & A men," and I am not so sure that
facetious remark is not justifiable. It is
n that any inquiry is made in the offices
olaryngologists as to the amount of sleep
patients get. Most otolaryngologists
d be surprised, as I was, to learn what
rtion of their patients get less than seven
' sleep—many get only four or five. One
not expect patients to have healthy mucous
branes or alert brains and be free from aches
pain with so little rest. I was surprised
d that 87 per cent of the patients in my
tion room with chronic trouble complained
tigue, and fully 50 per cent of them said
were exhausted.

was surprised when I found that 31 per
of my patients took some form of cathartic
ore or less regular intervals, either self
cribed or recommended by a druggist.
n, one could not expect such patients to
healthy mucosa, since cathartics interfere
absorption and assimilation of foods.
n the lubricating type is used, such as a
aration of liquid petrolatum, it prevents
rption of vitamin A, which is essential to
ealth and function of mucous membranes.

me form of liquid petrolatum is in every
cine cabinet in every hospital and in the
cine chest of nearly every home.

s stated by Curtis and Horton,[2] "amounts
ineral oil as small as 15 to 30 cc. are able
move the carotene (pro-vitamin A) from
ormal diet if the oil comes in contact with
food substances containing the carotene."

is my opinion that liquid petrolatum and
other cathartics interfere not only with
rption of vitamin A but with absorption
utilization of many or all of the other vita-
in foods.

Morgan[3] said:

would not be too unfair to say that in some
cts mineral oil has earned its niche in the section
of toxicology rather than in pharmacology. The wide use of liquid petrolatum seems to be based on empirical considerations which make little sense when examined critically. Its chemistry is, to say the least, uncertain and its pharmacologic action is a matter of dispute.

What applies to the use of liquid petrolatum may apply also to resort to many other cathartics, and physicians should never encourage this pernicious habit. One should think as sharply before prescribing a cathartic to be taken regularly or as circumstances may require as one does before giving a prescription for a narcotic.

The absorption and utilization of the vitamin B complex, essential to the physiology of nerve tissue, is greatly disturbed and may be almost inhibited by excessive consumption of alcoholic beverages (alcoholic neuritis), excessive intake of carbohydrates, taking of cathartics or excessive smoking.

The personal history blank brings out all of these factors.

The fact that excessive consumption of alcoholic beverages produces irritation of nerves and pain and eventually neural degeneration has been common knowledge for years. These effects may be partly due to inhibition of the desire for food. That the other habits named, such as large intake of carbohydrates, excessive use of cathartics and excessive smoking, have like effects has not been common knowledge, but sufficient scientific work has been done that this statement is past the dogmatic stage if not axiomatic.

The estimated average per capita consumption of refined sugar is 115 pounds (52 Kg.) per year. This is not all put into foods but is consumed in carbonated drinks, confections and other products. That sugar has a definite inhibitory action on the utilization of the vitamin B complex is so well recognized now that in most hospitals when dextrose solution is given intravenously for shock, B complex is put into the solution before the intravenous injection is started.

Such eminent authorities as Wilder and Keys,[4] stated:

Sugar is not among the recommended foods. Its recent rationing will not provoke a hardship, for sugar supplies nothing in nutrition but calories, and the vitamins provided by other foods are *sapped by sugar to liberate these calories.* One of the worst of the many bad food habits that Americans have acquired is their use of sweetened carbonated beverages. Many persons take such beverages by the pint many times

Curtis, A. C., and Horton, P. B.: The Utiliza-
of Vitamin A Added to Mineral Oil, Am. J. M.
00:102 (July) 1940.

Morgan, J. W.: Mineral Oil, an Indictment,
t of Treatment **5**:520 (Jan.) 1942.

4. Wilder, R. M., and Keys, T. E.: Unusual Foods of High Nutritive Value, in Handbook of Nutrition, Chicago, American Medical Association, 1943, chap. 14, p. 279.

a day, with a resulting excessive consumption of sugar.

Unless careful personal histories are taken, I am sure most otolaryngologists will not know anything of the habits of their patients as regards cathartics. I was surprised to find that 31 per cent of my patients were taking cathartics with more or less regularity.

Every day in their consulting rooms otolaryngologists are dealing with some form of pain complex, nerve irritation or neural degenerative changes.

The chronic trouble may be the sinus condition under discussion or it may be some other. One should give a great deal of consideration to the exhaustion complex in appraising a patient.

I recall in my early medical life hearing discussions on nutrition by Dr. J. A. Stucky, of Lexington, Ky., Dr. Burt Shurly, of Detroit, and later Dr. D. C. Jarvis, of Barre, Vt. There were many who came to these meetings to scoff at their remarks, and few who remained to pray.

In the practice of otolaryngology one deals with all tissues, i. e., ectoderm, mesoderm and endoderm. It seems logical that otolaryngologists should be interested in the nutrition and biochemistry of these tissues. In Washington, D. C., there are heart muscle and nerve tissue (the Lindbergh heart) which have kept in constant action for many years and may go on acting for a million years if properly nourished. There is no reason why otolaryngologists should, in their specialty, hold aloof from or fail to investigate the nutrition of their patients and advise them in regard to a proper selection of foods.

The fifth procedure is the observation of the autonomic nervous system. The autonomic nervous system can also be easily appraised. If it is the type in which the sympathetic division is dominant, the following signs are usually noted: (*a*) The patient is nervous, irritable, highstrung—people get in his way. (*b*) He has unlimited energy. He gets to be president of the firm in his early 30's and cracks up nervously or has a cardiac breakdown in the late 40's or early 50's. His speech is rapid, machine-gun-like. (*c*) His skin is usually dark and thick; beads of perspiration stand out on his forehead winter and summer. (*d*) He has a tendency to be obese and bald. (*e*) Pulse and blood pressure are usually elevated. Also, there is a slight elevation of temperature. (*f*) The pupils are somewhat smaller than normal.

The patient in whom the parasympathetic division is dominant is the exact opposite and is much more apt to have allergic symptoms. The fo needs small doses of iodine and mild acidu (if in middle life); the latter frequently thyroid and much more acidulation. Ivy[5] that "gastric acidity slows up after age achlorhydria increases considerably after 4 65, 35 per cent of people do not secrete

The appraisal of the autonomic nervous tem is of prime importance. While the patie whom the sympathetic division is domina not have fatigue and exhaustion, they do the other symptoms making up the com Their skin is constantly bathed in perspir which renders them more susceptible to and chronic sinus troubles. Iodine in the of strong solution of iodine U. S. P. (Lu solution) quiets down their nervous system may occasionally produce some degree of fat The latter has a beneficial effect in causing to take more rest, which may save them fr nervous or cardiac breakdown a few years

Sixth, glandular deficiency or overact must be noted. I have mentioned this already I want to add the following warnings: Th extract should be given in minimal doses under constant observation as to pulse rate, pressure, tremor and other pertinent ma I seldom find it necessary to continue th medication over a long period, and when drug is required, there should be rest per To women patients I frequently give it for two weeks at a time between menstrual c I have no doubt that overmedication without periods has a tendency to lessen the no thyroid secretion, especially in the obese pa with dominant parasympathetic division o autonomic nervous system.

Seventh, multiple dental caries must be n Diseased gums and malformed dental arches the most obvious signs of nutritional deficie When a deficiency is so great that degener changes take place in the hardest tissue i body, the enamel of the teeth, and in the maxillary bones, it is not difficult to imagine is taking place in the more secluded nerve other structures. No one practicing otola gology or any other branch of medicine sh fail to observe the condition of the teeth and mouth. The illustrations reproduced in figu are taken from "Nutrition and Physical De eration" by W. A. Price.[6]

5. Ivy, A. C., cited by Tuohy, E. L.: Feeding Aged, in Handbook of Nutrition, Chicago, Ame Medical Association, 1943, chap. 19, p. 365.

6. Price, W. A.: Nutrition and Physical De eration, New York, Paul B. Hoeber, Inc., 1939.

hth, psychoneurotic symptoms are frequently present. A diagnosis of psychoneurosis should never be made until one has eliminated all possibilities of an organic background. I have had several patients who were threatening to commit suicide because they were unable to get relief from their sinus troubles and exhaustion.

TREATMENT

The treatment begins with a review of the patient's food selection for the past three to five years. The analysis from the dietary history will usually give a clear picture of the nutritional background, and one must proceed accordingly. No hard and fast rules can be laid down for every patient; in fact, each case treatment must be individualized. Each patient must be taught to use those foods high in nutritional value in each class of foods. (See appended food charts of the American Medical Association Exhibit reproduced as an appendix to this article.) The following suggestions, however, are usually made:

Fig. 3.—Left: The reward of obeying nature's laws of nutrition. Note the breadth of the dental arches and the well proportioned features of these members of a West Nile tribe of the Belgian Congo. Their bodies are as well developed as their heads. Exceedingly few teeth are attacked by caries while they live on their native foods.
Right: Dental caries in Africans who have adopted the foods of modern commerce. The teeth shown here are typical of workers on plantations, which largely use imported foods.

1. Meat: At least one substantial meat serving is to be taken daily, with liver and pork two or three times a week.

2. Cereal or an egg: One or both are to be eaten daily. Oatmeal, puffed oats, cornflakes and soybean products are recommended. Wheat cereals are eliminated.

3. Vegetables: There are to be two servings of raw vegetables daily, composed of the green leafy, red and yellow varieties. These are to be served first at lunch and dinner, before any other food is taken. Cooked vegetables eaten during the meal may be left to the patient's selection after he has been instructed as to the ones most valuable. (See appended charts.)

4. Fruit or fruit juices: It is urged that one or the other of these be taken at each meal.

5. Bread: Soybean, corn, rye or pumpernickel are preferred to the highly milled white flour.

6. Sugar: All sweetened carbonated beverages are denied. Most patients are advised to use honey, which is a natural, unrefined sweetening, instead of white sugar, although a limited amount of the latter may be allowed. Saccharin is advisable for sweetening fluids such as iced tea and coffee.

7. No milk as a beverage: The drinking of milk is denied most patients because milk, sweets and refined flour are the three foods that produce mucous in the nose and the nasopharynx. The use of milk in cooking and the consumption of cream and butter are not denied.

8. Desserts: All sweet desserts are denied. Only fruits are allowed, always fresh if possible; if fresh fruits are not available, dried, canned or frozen fruits may be used.

9. Seafoods: Both deep sea and fresh water fish contain many of the minerals traces of which are so essential to body chemistry. Canned salmon is one of the chief natural sources of vitamin D.

10. No smoking: For patients with this syndrome the smoking of tobacco must be absolutely denied. It irritates all the upper respiratory mucous membranes. It has a tendency to constrict the peripheral circulation and produces congestion in the splanchnic areas.

11. Beverages: Occasional drinking of alcoholic beverages is not denied unless it seems reasonably certain that nerve tissue is being harmed. Tea and coffee in moderation are not denied unless they interfere with rest.

12. Condiments: These are not denied; in fact, they are urged when the patient has a poor appetite and is underweight or obviously undernourished.

VITAMIN THERAPY

Vitamin therapy is absolutely essential to the management of this type of sinus disease. I have seen many patients whose diet seemingly was ample and yet they had clinical signs of deficiency. The question of assimilation and utilization is of the utmost importance. Why one person may take only a limited amount of the proper foods and remain perfectly healthy while another takes ample foods and vitamins by mouth and still has obvious signs of malnutrition is a question to which present knowledge of body chemistry has not yielded the answer. It is my opinion, based on clinical observation alone, without scientific proof, that the p_H of the secretions and excretions may hold at least part of the answer. I have never encountered a patient with this syndrome in whom the vitamin deficiency was single—it is always multiple. Whatever the background for one deficiency is, that same background seems to hold for other deficiencies. I am cognizant of the original work of Spies,[7] Selfridge,[8] Campbell and Silcox[9] and others in regard to the deficiency of a single vitamin, especially nicotinic acid, but in the recent writings of Spies that view is now changed. After eight years of clinical observation and experimentation I can get satisfactory results with the following procedure:

1. Correction of the food deficiencies shown in the dietary history.
2. Intravenous administration of vitamins.
3. Oral administration of vitamins.
4. Correction of bad physical habits.
5. Local treatment as indicated.

The food selections must be individualized and specific and must be written out—not just given to the patient verbally.

The intravenous administration of vitamins overcomes the immediate inability of the patient to assimilate and utilize vitamins taken by mouth. When vitamins are put directly into the blood stream there is no question about their assimilation, and the results are convincing to both the patient and the physician. After disappointing clinical results with the intravenous administration of the single factors, such as nicotinic acid, which produced some reaction, I gave th entirely and injected a B complex prepara One 2 cc. ampule of this contains:

Thiamine hydrochloride (3,333 U.S.P. or international units of vitamin B_1)	10
Riboflavin	4
Nicotinamide	150
Pantothenic acid (as calcium pantothenate)	5
Pyridoxine hydrochloride (vitamin B_6 hydrochloride)	10

(The preparation contains 12.5 per cent sulf

My colleagues and I have given over 3 intravenouus injections of this B complex p ration without a reaction of significance. We on the average twenty-five to forty intrave treatments daily. Occasionally, a patient complain of gastric discomfort or of a s flushing which passes away quickly; appare the reaction is due to nicotinamide; howeve is not severe and is fleeting. This occurs in than 1 per cent of a highly unselected gr Many patients known to have cardiac disea to be allergic are now under treatment for s trouble—patients of a type that we hesitate take in our early work. The results in pati with cardiac and hypertensive conditions ar highly satisfactory from the standpoint of re tion of anginal symptoms and headaches tha welcome the opportunity to treat such pati

Our rule is to give three intravenous treatm the first week and two each week thereafter ten are given. This rule is arbitrary since we pioneering and had no precedent to follow. H ever, I am sure it is minimal; in the case severe symptoms, more should be given.

Also, we give 500 mg. of vitamin C in same syringe with the B complex to all patients or to those who show a deficienc vitamin C. The vitamin C is not combined the B complex in the same ampule by the m facturer, because of poor stability.

Vitamins by Mouth.—During the first m we usually give vitamins A and D three ti daily, which are combined in the following mula, because vitamin A and D appear toge in nature and may well be administered in c bination:

Vitamin A	5,000 U.S.P. or international un
Vitamin D	500 U.S.P. or international un

At the end of the month the patient is reappra The hemoglobin content, the pulse rate, the bl pressure, the temperature, the weight and complaints noted on the personal history b

7. Spies, T. D.: Detection and Treatment of Nutritional Deficiency Diseases Among Industrial Workers, J. A. M. A. **125**:245 (May 27) 1944.

8. Selfridge, G.: Present Status of Vitamins in Relation to VIIIth Nerve and Conduction Deafness, Arch. Otolaryng. **34**:125 (July) 1941.

9. Campbell, E. H., and Silcox, L. E.: Progressive Deafness: An Abstract Summary of the Available Literature Published During 1941, Laryngoscope **52**: 380 (May) 1942.

10. All the material used in my early work supplied by Eli Lilly and Company, of Indiana

iscussed. If there is a vitamin B deficiency, les containing a B complex preparation are ribed, the formula of which follows: (each le):

amine hydrochloride (vitamin B_1, or ,000 U.S.P. or international units) ...	3 mg.
oflavin (vitamin B_2)	6 mg.
idoxine hydrochloride (vitamin B_6 hydrochloride)	0.5 mg.
otinamide	30 mg.
ntothenic acid (as calcium panthothenate)	10 mg.
siccated fraction of a liver-stomach concentrate	0.6 Gm.

there is a deficiency of vitamins in general, rescribe panvitamins, each Gelseal containing ollowing formula:

iamine hydrochloride.....	3 mg.
oflavin	2 mg.
thothenic acid (as calcium pantothenate)	1 mg.
otinamide	20 mg.
corbic acid.....	75 mg.
stilled natural tocopherols.....	10 mg.
tamin A.....5,000 U.S.P. or international units	
tamin B.....500 U.S.P. or international units	

some instances, if the patient thoroughly ws the food selections, vitamin therapy may iscontinued at the end of six months. Vitatherapy may have to be continued indefinitely re the available foods are produced from ed soils or soils leached of the natural min-. The same is true where transportation ities for marketing fresh foods are bad. re is a tremendous loss of food vitamin value r these conditions. Trace minerals, so essento body chemistry, are prescribed.

SUMMARY AND CONCLUSIONS

hope this discussion will help clarify certain troubles about which otolaryngologists shown little uniformity of thought and n. They have vaguely classified these as omatous, hypertrophic, hyperplastic and um types. The results from the surgical tment of these conditions have been so highly tisfactory as to make all nasal surgery, even absolutely essential procedures, fall into dis- te with both the layman and the conscien-, conservative physician. Histamine as well pecific desensitization must be considered for llergic patients.

ne must investigate the nutritional habits—by asking questions but by studying a dietary ory blank filled out in writing by the patient. personal history blank is equally important. One records the blood pressure, the pulse rate, the hemoglobin content, the p_H of secretions and excretions, and repeats these recordings as often as necessary.

One has asked the patient to make specific statements in writing in the beginning; one must be equally specific in writing directions for food selections and for correction of such habits as using cathartics, smoking and getting insufficient sleep. The average patient will not remember verbal instructions and must be prodded to read and reread the written instructions over a period of months. They must be rechecked once a month for several months or until the food selections and new personal habits are a part of their natural routine. I find few patients uncooperative; patients are usually so enthusiastic about results that they will follow instructions absolutely.

Vitamins are essential in the management of patients with this syndrome. Intravenous administration is the only method by which one can be assured of absorption and utilization in every case. There are patients who do fairly well with oral administration, but the process is slower and more uncertain. After the body metabolism has been stimulated by intravenous administration, oral administration is more effective. As I have repeatedly stated in this report, the patient must be taught to get the necessary vitamins in properly selected foods.

There are some physicians who hesitate to prescribe vitamins chiefly because of the fact that they have been extensively publicized. I cannot quite understand this attitude since five Nobel prizes have been granted on vitamin research and the therapeutic value in properly selected cases is so well known.

The pathologic condition with an imbalance of the colloids of the body in the background offers a starting point for further observations and investigations.

Finally, the successful management of patients with this form of sinus disease depends on attending to every detail as outlined. This cannot be done without the blanks shown in figures 1 and 2. Improvement cannot be obtained with vitamins alone. Attention must be paid to every phase of the patient's condition. When this is done, the complete failures are so rare that they can be charged to wrong diagnosis in the beginning.

When the patient is properly managed, it is not unusual to have the major portion of the symptoms relieved at the end of two months.

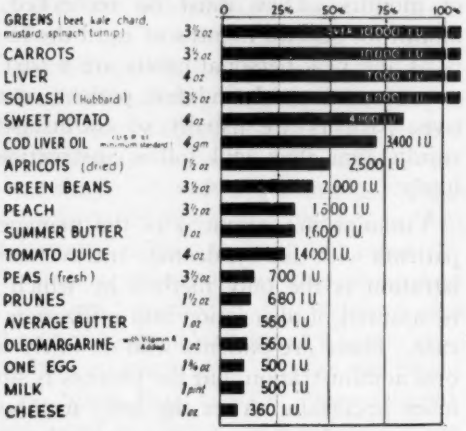
1110 Professional Building.

APPENDIX

FOODS AS SOURCES OF VITAMIN A

Green, leafy, and yellow vegetables are outstanding sources. Dairy products, eggs and liver (and fish liver oils) are the important animal sources. Vitamin A is well conserved in cooking . . . .

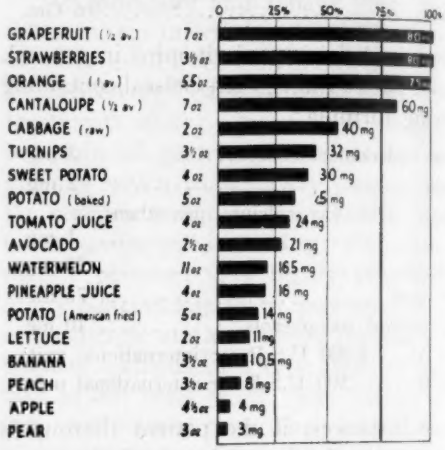
CONTRIBUTION OF SELECTED SERVINGS OF A FEW FOODS AS PERCENTAGES OF ADULT MALE ALLOWANCE (5000 INTERNATIONAL UNITS (I.U.))



FOODS AS SOURCES OF ASCORBIC ACID (VITAMIN C)

In addition to citrus fruits and tomatoes many common fruits and vegetables supply significant amounts of ascorbic acid, especially if eaten raw. This vitamin is readily destroyed by heat and it is extracted by water.

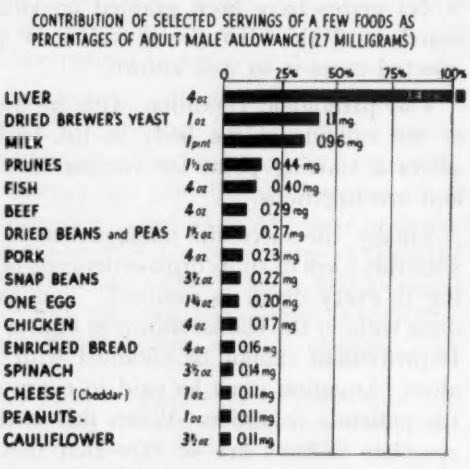
CONTRIBUTION OF SELECTED SERVINGS OF A FEW FOODS AS PERCENTAGES OF ADULT MALE ALLOWANCE (75 MILLIGRAMS)



FOODS AS SOURCES OF RIBOFLAVIN (VITAMIN G)

Milk is the most important common source of riboflavin. This vitamin is not readily destroyed by heat but it may be lost by extraction in water during cooking and by prolonged exposure to light.

CONTRIBUTION OF SELECTED SERVINGS OF A FEW FOODS AS PERCENTAGES OF ADULT MALE ALLOWANCE (2.7 MILLIGRAMS)



FOODS AS SOURCES OF THIAMINE (VITAMIN B_1)

Except for pork, common foods supply only small amounts of thiamine, the best sources being nutritionally unimpaired cereals and meats; some thiamine may be lost in cooking, either through destruction by heat or extraction by water . . .

CONTRIBUTION OF SELECTED SERVINGS OF A FEW FOODS AS PERCENTAGES OF ADULT MALE ALLOWANCE (1.8 MILLIGRAMS)

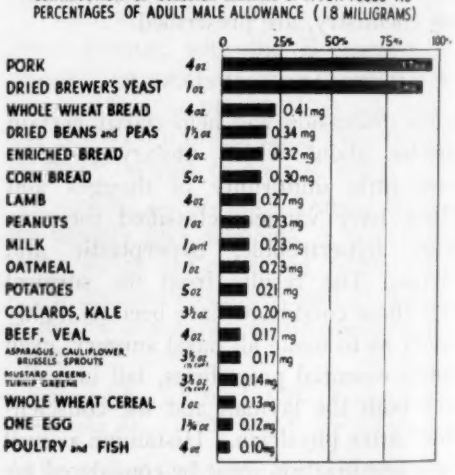


Fig. 4.—Posters of the American Medical Association Exhibit on nutrition, entitled "Foods as Sources of Dietary Essentials," prepared by a joint committee of the Council on Foods and Nutrition of the American Medical Association and of the Food and Nutrition Board of the National Research Council.

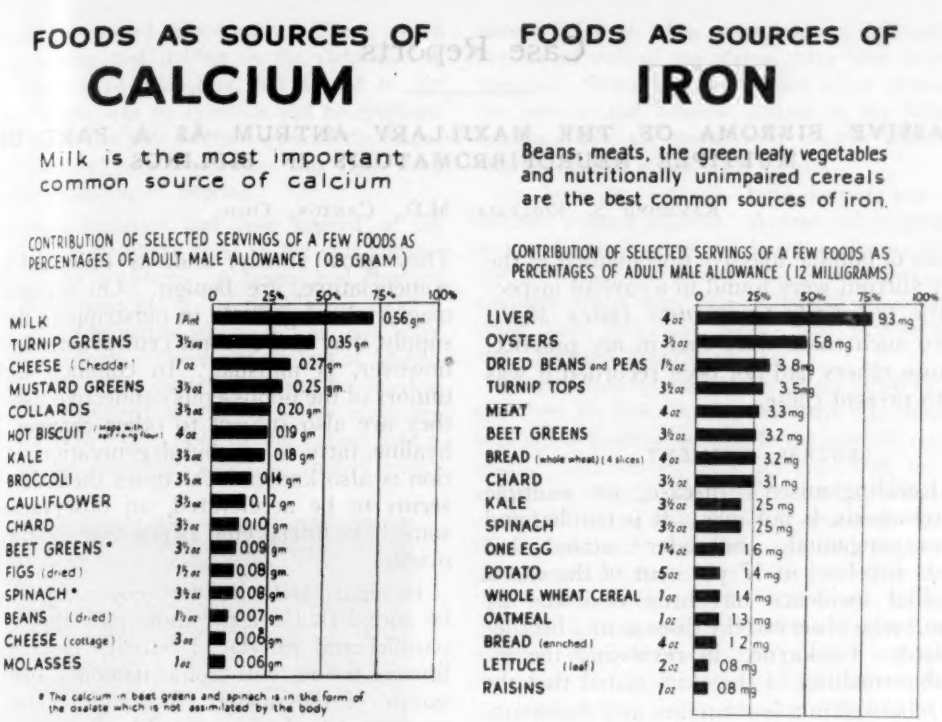

FOODS AS SOURCES OF
CALCIUM
Milk is the most important common source of calcium
CONTRIBUTION OF SELECTED SERVINGS OF A FEW FOODS AS PERCENTAGES OF ADULT MALE ALLOWANCE (08 GRAM)
0 25% 50% 75% 100%
MILK 1 Pint 0.56 gm
TURNIP GREENS 3½ oz 0.35 gm
CHEESE (Cheddar) 1 oz 0.27 gm
MUSTARD GREENS 3½ oz 0.25 gm
COLLARDS 3½ oz 0.20 gm
HOT BISCUIT (made with self-rising flour) 4 oz 0.19 gm
KALE 3½ oz 0.18 gm
BROCCOLI 3½ oz 0.14 gm
CAULIFLOWER 3½ oz 0.12 gm
CHARD 3½ oz 0.10 gm
BEET GREENS * 3½ oz 0.09 gm
FIGS (dried) 1½ oz 0.08 gm
SPINACH * 3½ oz 0.08 gm
BEANS (dried) 1½ oz 0.07 gm
CHEESE (cottage) 3 oz 0.06 gm
MOLASSES 1 oz 0.06 gm
* The calcium in beet greens and spinach is in the form of the oxalate which is not assimilated by the body
FOODS AS SOURCES OF
IRON
Beans, meats, the green leafy vegetables and nutritionally unimpaired cereals are the best common sources of iron.
CONTRIBUTION OF SELECTED SERVINGS OF A FEW FOODS AS PERCENTAGES OF ADULT MALE ALLOWANCE (12 MILLIGRAMS)
0 25% 50% 75% 100%
LIVER 4 oz 9.3 mg
OYSTERS 3½ oz 5.8 mg
DRIED BEANS and PEAS 1½ oz 3.8 mg
TURNIP TOPS 3½ oz 3.5 mg
MEAT 4 oz 3.3 mg
BEET GREENS 3½ oz 3.2 mg
BREAD (whole wheat) (4 slices) 4 oz 3.2 mg
CHARD 3½ oz 3.1 mg
KALE 3½ oz 2.5 mg
SPINACH 3½ oz 2.5 mg
ONE EGG 1¾ oz 1.6 mg
POTATO 5 oz 1.4 mg
WHOLE WHEAT CEREAL 1 oz 1.4 mg
OATMEAL 1 oz 1.3 mg
BREAD (enriched) 4 oz 1.2 mg
LETTUCE (leaf) 2 oz 0.8 mg
RAISINS 1 oz 0.8 mg

Fig. 5.—Further posters of the American Medical Association Exhibit on nutrition.

*Vitamin Content of a Few Typical Foods**

Food	Thiamine	Riboflavin	Nicotinic Acid	Pantothenic Acid	Pyridoxine
	Milligrams per hundred grams (edible portion)				
s	0.025	0.050	0.500	0.050	.....
as	0.040	0.080	0.600	0.070	.....
:					
e (unfortified)	0.070	0.100	0.800	0.400	0.300
et (fortified)	0.280	0.14	1.500	0.400	0.300
age	0.060	0.050	0.290	0.225	0.290
ts	0.050	0.100	1.500	0.210	0.190
e	0.030	0.500†	.....	0.350	.....
meal†	0.200†	0.150	1.500	0.800	.....
	0.250†	0.400†	0.050	2.700†	.....
:					
f	0.150	0.250	6.500†	1.100†	0.400
k (loin)†	1.500	0.200	9.200†	1.500†	0.600†
ltry (light meat)	0.075	0.060	6.100†	0.800	.....
ltry (dark meat)	0.100	0.250	7.300†	2.000†	0.200
f's liver	0.400	3.200†	20.000†	5.200†	.....
k liver	0.400	2.700†	22.000†	5.400†	.....

Food	Thiamine	Riboflavin	Nicotinic Acid	Pantothenic Acid	Pyridoxine
	Milligrams per hundred grams (edible portion)				
Milk (whole, fluid)	0.045	0.200	0.070	0.300	0.200
Oatmeal†	0.800†	0.160	1.130†	1.300†	0.250
Oranges	0.070	0.030	0.220	0.070	.....
Peas (fresh)	0.300	0.190	0.750	0.600	.....
Peanuts†	0.800	0.300	13.000†	3.400†	.....
Potatoes	0.125	0.060	1.160	0.400	0.160
Spinach	0.075	0.250†	0.720	0.200	.....
Tomatoes	0.050	0.050	0.580	0.075	.....
Turnips	0.040	0.060	.....	0.250	.....
Yeast (brewers' dry)	12.000	4.000	40.000	20.000	5.500
Whole wheat	0.450	0.120	5.900†	1.300	0.460

* The table is from the "Handbook of Nutrition" (Chicago, American Medical Association Press, 1943).

† The high nutritive value is to be noted.

The teachings of Dr. D. C. Jarvis, of Barre, Vt., on the subjects of nutrition and biochemistry have been inspirational. While I have not quoted him directly, I have incorporated many of his ideas in this investigation.

Case Reports

MASSIVE FIBROMA OF THE MAXILLARY ANTRUM AS A PART OF MULTIPLE NEUROFIBROMATOSIS IN SIBLINGS

RAYMOND S. ROSEDALE, M.D., CANTON, OHIO

No cases of familial massive fibromatosis of the maxillary antrum were found in a careful inspection of the *Quarterly Cumulative Index Medicus*. Two such cases were met in my practice, and because others had not been recorded it was decided to present these.

GENERAL COMMENT

Von Recklinghausen's disease, or multiple neurofibromatosis, is not rare. It is familial and sometimes congenital. Schröder [1] stated that heredity is involved in 17 per cent of the cases. The familial incidence has been reviewed by Castellino,[2] who observed the disease in a brother and a sister. Cockayne,[3] in reviewing the inherited abnormalities of the skin, stated that the defect is inherited in a few families as a dominant.

Clinically the disease is characterized by the association of multiple tumors of the nervous system, including the sympathetic, motor and sensory nerves, and sometimes abnormalities of the endocrine and vascular systems. It is not infrequently associated with café au lait spots of the skin.

Ewing [4] reported associated defects, such as gliosis and tuberous sclerosis of the brain and spinal cord, spina bifida and meningocele. He also mentioned association of various types of nevi and melanomas, localized and generalized elephantiasis and abnormalities of the bones. He specifically mentioned involvement of mucous membranes. Many times the superficial tumors are symptomless, becoming objectionable only because of their size, location, traumatization or multiplicity. Deeper-seated tumors may cause symptoms because of anatomic tamponade occurring as a natural development in their growth.

Grossly the tumors are smooth, pearly gray and usually firm and are easily separated from the surrounding tissues.

As already indicated, they are commonly multiple. Their gross blood supply is usually poor. They grow slowly, and, as indicated by nomenclature, are benign. On occasions magnitude of growth, in outstripping their supply, may lead to some central softening. however, is unusual. In common with tumors of the nonosseous connective tissue they are also subject to other changes, such hyaline, fatty or mucoid degeneration. Calcification is also known. At times their develop seems to be accelerated, an observation some have interpreted as pointing to an endo origin.

In regard to their microscopic structure it be stated that for the most part they consi parallel and interlaced bundles of collagen fibrous tissue, with some tendency toward sading of the nuclei. Reticulum fibers are uncommonly demonstrated by suitable stain

Those who have studied the pathology of tumors are divided into three schools of tho viz., those who regard the tumors as havi true origin in nerves, those who believe that arise from mesoblastic tissue and those who lieve that they have a mixed origin. It is pos that they have a mixed origin, and it is pos that the neurogenic elements degenerate and appear. I am inclined to regard them as m blastic in origin and to designate the type as neurial fibroblastoma. I have seldom de strated neural elements in these tumors.

Fibroma of the maxillary sinus could from the connective tissue elements presen this structure or from the elements of the bran of the nerves supplying it. When such a tu occurs in a person with generalized neurofi matosis, it seems only reasonable that the sec possibility is most likely.

The cases of massive maxillary fibroma association with von Recklinghausen's dis presented here are those of a brother and a si By coincidence the sister, who lives in a diffe city, presented herself in the office on the af noon of the day on which her brother had tumor removed.

REPORT OF CASES

CASE 1.—C. L. G., a white man aged 51, a fa supervisor, was referred by Dr. R. T. Warburto North Canton, Ohio, on July 9, 1941.

The patient stated that he had had right-sided n obstruction for two years, accompanied intermit by a postnasal yellow discharge. A dull burning was experienced at times in the region of the right ca

1. Schröder, C. H.: Beitrag zur Vererbung der Recklinghausenschen Neurofibromatose, Beitr. z. klin. Chir. **164**:563-572, 1936.

2. Castellino, P. G.: Familial Recklinghausen's Disease; Clinical and Pathogenetic Contribution, Urol. & Cutan. Rev. **34**:384-390 (June) 1930.

3. Cockayne, E. A.: Inherited Abnormalities of the Skin, London, Oxford University Press, 1933, p. 274.

4. Ewing, J.: Neoplastic Diseases, ed. 4, Philadelphia, W. B. Saunders Company, 1940.

Sneezing occurred occasionally. There was a
on of burning and itching on the right side of
se. Colds were infrequent, but tended to last
time. There was no epistaxis and no epiphora.
onally there was pain in the region of the tragus
right ear, and sometimes there was right-sided
with diminution of hearing.

roentgen radiation had been applied in the
of the right maxillary sinus in the past without
ement of the symptoms. A dentist had removed
e of tissue from above the right gum" about a
efore my examination which, it was said, gave
to the diagnosis. There was no loss of weight,
h or appetite. The interrogation and the physical
ation were limited to the ears, the nose, the
and the eyes. One child of the patient had a
ance of the nose and paranasal sinuses which

1 (case 1).—Expansion of the right maxillary
and destruction of bone revealed by iodized oil
d into the cavity.

oved allergic. The nasal septum was deviated to
ght. The nasal mucosa was pale and slightly
ous. There was an excess of mucus. Eosino-
ere found in the nasal secretion. A small gray
polyp was seen on the ostium of the left
id sinus with the aid of the nasopharyngoscope.
r polyps were seen on the posterior end of the
middle turbinate. The right antrum was dark on
lumination. Roentgenograms of the sinuses were
d and reported as "indicating a tumor of the
not connected with the bone."

t 3 cc. of iodized poppyseed oil 40 per cent was
d into the right antrum. A subsequent report
he roentgenographic department of Mercy Hos-
ollows: "The left antrum is clear. The iodized
cted into the right antrum outlines a large mass
is projecting into the lumen upward and medially,
almost filling it. The anteroinferior wall and part of the lateral wall of the antrum have been destroyed by pressure. There is also a definite effect of pressure on the inferior and anterior surface of the body of the zygoma. We are undoubtedly dealing with a benign expansile tumor of the right antrum."

On Sept. 26, 1941 the right antrum was explored through a small incision. A firm red bulging surface of the mesial aspect of the lateral wall was seen. This was unyielding, and having been denied permission to do anything more than take a biopsy specimen of the lining only, this was done. The pathologic report was "polypoid hyperplasia."

After the wound healed, the patient failed to reappear until Sept. 18, 1944. At this time there was a firm, almost hard and unyielding swelling in the superior right buccal sulcus. This seemed to be confluent with the maxilla, and it was thought that a defect of the anterolateral wall of the maxillary sinus could be palpated. Some firm tissue was also palpable in the angle between the superior ramus of the mandible and the right sternomastoid muscle. There was a swelling in the canine fossa which was about the size of half a walnut. The patient stated that he still had pain in the region of the right antrum. This was constant, dull and compressive. There was some difficulty in mastication, described as "stiffness of the jaws".

The eyes when examined by my colleague, Dr. C. J. Streicher, disclosed only proptosis of small degree of the right as compared with the left eye.

The general examination of the patient showed several firm subcutaneous nodules. The largest of these was the size of a filbert. One was behind the left ear, one was on the posterior aspect of the neck, one was on the trunk, and one was on the left thigh. When pressure was applied to the last, pain was felt in the leg and in the dorsum of the foot. There were several ovoid areas of brown discoloration of the skin. The patient stated that these nodules had developed since about the age of puberty and had never received any special attention. He did not acknowledge the presence of any similar condition in other members of his family. There were no other systemic findings of note. The urinalysis and the studies of the blood gave essentially normal results.

The patient was operated on again in Mercy Hospital on Sept. 26, 1944. Nitrous oxide and ether, administered by intratracheal tube, were the anesthetic agents. A horizontal curvilinear incision was made over the prominence of the firm mass presenting in the region above the right superior alveolus. The tissues were reflected until a firm pink-gray smooth mass was encountered. The atrophic, thin, deficient anterolateral wall of the right maxillary sinus was identified, and with the use of elevators an attempt was made to free the mass from the walls of the antrum. This separation would have been easy had it not been for the bulk of the tumor, for everywhere, except at the roof of the antrum, there was a distinct line of cleavage such as one finds in the case of a benign tumor. The tumor was adherent by firm fibrous strands extending into what seemed like fine dehiscences of the roof of the antrum, where it was necessary to sever the attachment with scissors.

The tumor was more extensive than was first thought. It was found to have caused pressure atrophy and erosion of the posterior wall of the antrum. Large lobulations of the tumor were found in relation to the lateral muscle attachments of the coronoid process, and, as nearly as could be determined, some of the tumor was in relation to the right pterygomaxillary fossa.

The cavity occupied by the tumor was liberally dusted with sulfathiazole powder, and a long piece of iodoform gauze soaked with Peruvian U.S.P. balsam was placed therein. The wound was partly closed with sutures. The pack was shortened on three successive days and removed on the fourth day. On October 28 the wound

Case 2.—C. E. G., a white housewife, was fir in consultation on Sept. 26, 1944. She stated t ten years she had been increasingly conscious of developing in the region of the right canine fossa was accompanied by a "pulling and drawing" se in this region, felt especially at night. The remai the inquiry with regard to the ears, the nose a throat elicited nothing pertinent except a history o allergy. She admitted having other masses on th which had been present for an indeterminate num years. She stated that her brother had a similar ing in the region of the right maxillary sinus a she vaguely remembered that he had had small ma

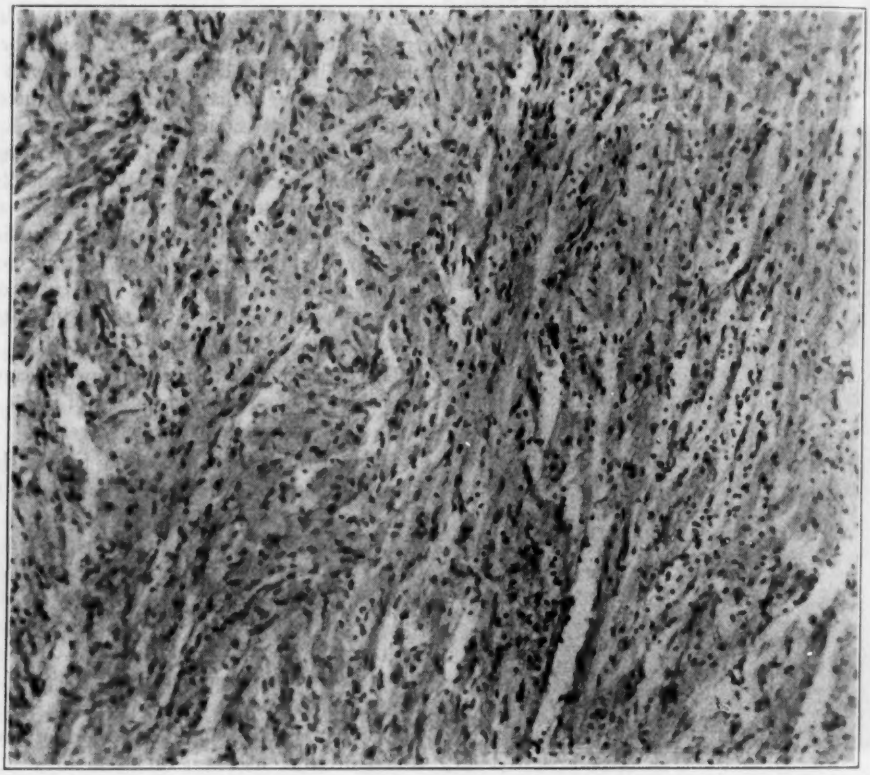


Fig. 2 (case 1).—A representative area of the tumor.

was seen to be healed. Trismus was a fairly conspicuous feature during the first two weeks of convalescence.

The pain and swelling which were present before operation have not recurred.

It is believed that in our first case the symptoms of tumor have been cured by the removal of the tumor. When last examined, on Jan. 15, 1945, the patient complained only of a sensation of numbness of the right canine fossa and slight limitation of the movement of the lower jaw. The numbness is attributed to avulsion of some of the fibers of the infraorbital nerve occurring when the tumor was detached from the dehiscences of the roof of the right maxillary antrum. The slight limitation of movement of the jaw is attributed to some fibrosis of the muscles in the right masticator compartment due to trauma, local hemorrhage and the packing, such as would accompany any operative procedure, in this area.

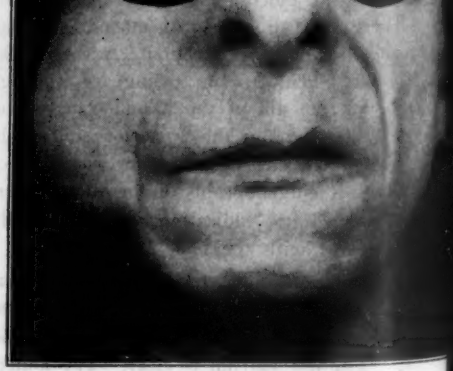


Fig. 3 (case 2).—Patient with a fibroma in the maxillary area.

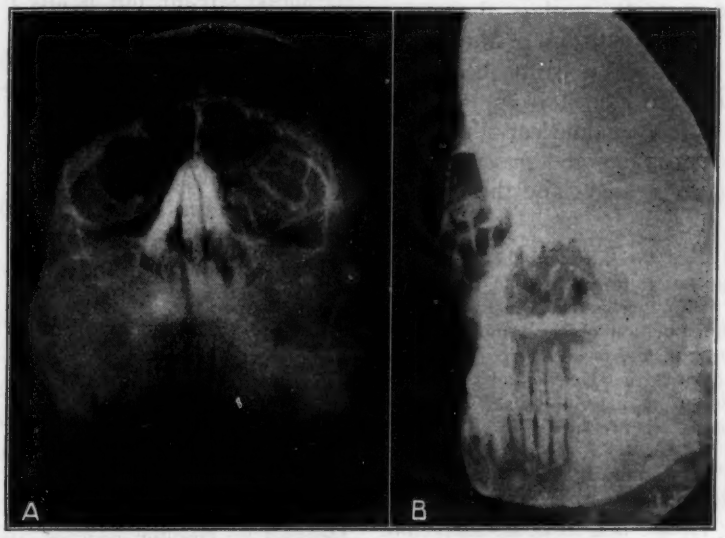
, but she did not associate his condition with hers. arly childhood she had been aware of increasing difficulty.

e was a prominent rounded mass with shining, hat thinned overlying skin in the region of the fossa just medial to and below the molar ce. It was roughly about the size of a small plum, nd nontender. A roll-like firm mass was found the right superior alveolar process. Bimanual on conveyed the sensation that this and the afore- ned tumor were part of the same pathologic proc- he borders of the tumor could be outlined clearly ation, negating the probability of any malignant eristics. Careful palpation gave one the impres-

Three were on the head and neck, one on the trunk, two on the back and one on the extremities.

The roentgenograms were described by Dr. G. D. Popoff as follows: "The left antrum is intact. The right antrum presents dense clouding, the inferior and lateral borders being completely destroyed. The inferior margin of the orbit is bulged upward. The body of the zygoma also shows definite effects of pressure, this being manifested by a curved line with convexity directed laterally. All these changes indicate a benign expansile neoplasm within the right antrum."

Removal of the tumor was suggested to the patient. She has not consented to this as yet, nor has a biopsy been made. There seems to be no reasonable doubt that



. 4 (case 2).—*A*, expansion of the right maxillary antrum and atrophy of bone with pressure involvement floor of the orbit. *B*, pressure atrophy of the anterior wall of the antrum.

at the lateral and anteroinferior portions of the all of the maxillary sinus were defective. Also ttempted bimanual ballottement one received the ion that the mass over the canine fossa and that region of the superior alveolar process were con- with, and a constituent part of, one within the or firmly attached within the antrum.

nasal septum was deviated to the right. There e usually accepted signs of nasal allergy. There proptosis. Dr. C. J. Streicher, after examination eyes, reported well defined bilateral keratoconus, rneal opacities in one eye.

t subcutaneous nodules, varying in size from that ea to that of an acorn, were found elsewhere.

the tumor in this patient is similar to that in the first. Its clinical resemblance is exceptionally striking not only as to size and location but also as to consistency, definability of borders, rate of growth and association with multiple other tumors characteristic of von Recklinghausen's disease. The patient has been advised that the only satisfactory treatment of tumors such as these is their complete surgical removal and that irradiation is unsuccessful.

SUMMARY

A brother and a sister each presented massive fibroma of the right maxillary sinus as a part of multiple neurofibromatosis

Progress in Otolaryngology

Summaries of the Bibliographic Material Available in the Field of Otolaryngology for 19

THE PARANASAL SINUSES

SAMUEL SALINGER, M.D.
CHICAGO

PHYSIOLOGY AND PATHOLOGY

Robison [1] presents a study of the lymphatic drainage of the nasal sinuses, the eustachian tube and the pharynx, on the basis of which he postulates a theory of its function in health and in disease. According to the author, the retropharyngeal lymph system consists of the retropharyngeal lymph nodes and a lymph bed serving all the structures developed from the first branchial pouch, viz., the middle ear, the nasal septum, the eustachian tube, the nasopharynx, the adenoids, the nasal passages and the sinuses. He states that

> . . . lymph is drained from the nose and the sinuses by gravity and arterial pulsation transmitted to the lymph spaces. The lymph pump mechanism which functions particularly during inflammation of the lymph bed depends for its efficiency on partial or complete obliteration of the air-containing cavities of the nose and sinuses, to facilitate the transmission of arterial pulsation to the lymph vessels by hydrostatic pressure.

He presents a number of drawings showing what happens within the mucosa of the sinuses and the underlying lymph bed in acute infection, chronic infection, allergy and combinations of the former with the last named. The role of the normal colloid pressure in keeping the lymph and the tissue fluids separate from the blood volume is mentioned as a stabilizing factor. The author then describes how fluid and proteins are transferred from the blood through the capillaries, how the tissues become distended under the stimulus of infection and how the lymph system and reticuloendothelial elements eliminate the products of inflammation. The question as to how long a sinus can continue to have edematous mucosa and then return to normal remains a topic for further study. He suggests that the answer may lie in a deeper study of the "physical and chemical characteristics of the edema fluid and its effect on fibroblasts as observed during tissue culture."

Dixon and Hoerr,[2] employing minute quantities of india ink injected into the mucosa of the maxillary sinuses of rabbits, show that lymphatic drainage is slow, following the ve of the lateral nasal and nasopharyngeal before reaching the retropharyngeal and jugular glands. None of the material re the blood stream, nor is any found in the l or the bronchial lymph nodes. They claim in Mullins' experiments, as well as in tho Fenton and Lorsell, the foreign material re ered in the lower respiratory tract could reached this region only by an overflow int respiratory passages and that the amounts ployed were far in excess of the capacity o sinal mucosa.

The authors' clinical deduction is that lymphatics play no part in the associatio infections of the sinuses with infections o lower respiratory tract. They feel that such an association is present it can be expla only on the basis of direct aspiration. also state that the incidence of these coexi infections is high in children with an all background. In these children the nos blocked by swollen mucosa and tenacious s tion, which is dislodged with difficulty. believe that frequent cleansing of the nose removal of such secretion will do much to vent dependent drainage into the lower res tory tract with secondary bronchopulmo involvement.

Nungester and Atkinson [3] made 173 dete nations of the mucosal p_H in situ in 142 per The readings ranged from 6.6 to 7.6. Fo per cent of the group they were between and 7.2, and for 39 per cent, between 7.0 7.1. The authors conclude, therefore, that normal p_H of the nasal mucosa is on the alk side, which is contrary to Fabricant's findi They hold that Fabricant's system is more ject to error because his electrode failed to m tain adequate contact with the mucosa. believe that by their method the reference mel electrode is placed closer to the point of tact of the nasal electrode, thus eliminating of the extraneous potential sources of which may have influenced Fabricant's recor

1. Robison, J. M.: Lymphangitis of the Retropharyngeal Lymphatic System, Arch. Otolaryng. **40**:385 (Nov.) 1944.

2. Dixon, F. W., and Hoerr, N. L.: The Lymphatic Drainage of the Paranasal Sinuses, Laryngoscope **54**: 165 (April) 1944.

3. Nungester, W. J., and Atkinson, A. K.: p_H o Nasal Mucosa Measured in Situ, Arch. Otolaryng 342 (April) 1944.

e authors found that in 30 patients with rhinitis the p_H was essentially the same as rmal persons.

e wide differences between the authors' find- nd those of Fabricant are rather disturbing, the question of what the p_H is under nor- nd under pathologic conditions is important e preparation of various nasal medicaments. loubt further studies will be forthcoming, n should settle the question.

lding [4] shows some excellent photographs rating the path of ciliary motion within the es. This was made possible by observing ourse of minute drops of india ink placed e opened sinuses at autopsy, the craniums g been opened soon after death, while the s were still warm. Observations on the llary, the frontal and the sphenoid sinuses led the foreign particles moving in a spiral toward the ostium.

nsidering the rationale of sinal irrigation, uthor states that whereas under normal con- s the sinus can expel a normal film of s within fifteen minutes, diseased condi- may so alter the character, the consistency he amount of the secretion as to overtax the y capacity, leading to retention. Thus, irriga- erves a useful purpose in relieving the over- ned cilia and preventing their deterioration.

tzman [5] cites a number of authors on the ct of the absorptive capacity of the nasal sa and offers some comments. He holds bsorption varies with the anatomic status, resence or the absence of pathologic condi- and the location. Less absorption takes when the drug is administered by swab when it is sprayed with an atomizer. A degree of absorption takes place from a on placed between the inferior turbinate he septum. When the drug is introduced a sinus, the rate of absorption will depend e activity of the cilia and on the viscosity medicament. The longer it is retained in inus the greater the absorption. Among factors mentioned is the type of material in- ced, since it has been found that there is a tendency toward selectivity in the absorption aterial. For instance, the author mentions igh degree of absorption of the endocrine ples of the pituitary gland and the ovaries.

non [6] investigated the fluctuations in air ure within the nasal passages, the maxillary es and the trachea. He offers a critical analysis of previous reports on this topic, with comments on variations due to the procedure followed, and his own conclusions. According to Simon, the readings from the sinuses may be the same as those from the nasal passages, but frequently they are found to be less because of anatomic factors which interfere with rapid passage of the air back and forth. Pressures are all lowered after the use of vasoconstrictors and tend toward equalization. It was found that in the presence of a large ostium or accessory ostiums the pressure readings of an antrum tended to equal those of the corresponding nasal fossa. No fluctuation of pressure was interpreted as being due to occlusion of an ostium by edema or secretion.

Rosenberger [7] does not believe that infection of the sinuses predisposes to aplasia of the sinuses and thinks that the Wittmaack theory of altered pneumatization of the mastoid process does not explain alterations in size of the sinuses.

A study of 163 patients revealed only 53 per cent with symmetric frontal sinuses, whereas the antrums were symmetric in 87 per cent. Furthermore, in the same group 10 per cent had infected frontal sinuses, while the incidence of infection of the antrums was 74 per cent. It is evident from these statistics that were infection the cause of arrested development, one would expect to find the antrums affected more frequently than the frontal sinuses, whereas in fact the opposite is true.

Cullom [8] reviews his contributions to the literature on sinusitis as related to various disorders, including otitis media, mastoiditis, asthma, herpes zoster, pyelitis, repeated attacks of pneumonia and heart disease. He cites several cases illustrating the relationship and again emphasizes the importance of a careful search of the sinuses for foci of infection which may have been present for a long time.

Whitaker's article [9] is practically a duplicate of the one which was published in 1942 [10] and abstracted in the review of the literature of last year.[11]

Hilding, A. C.: The Physiology of Drainage of Mucus: IV. Drainage of the Accessory Sinuses in Ann. Otol., Rhin. & Laryng. **53**:35 (March) 1944.

Saltzman, M.: Absorptive Capacity of the Nose, Otolaryng. **40**:44 (July) 1944.

6. Simon, E.: Atmospheric Pressures in the Nasal Fossa, the Maxillary Sinus and the Trachea, Arch. Otolaryng. **39**:504 (June) 1944.

7. Rosenberger, H. C.: Does Sinus Infection Affect Sinus Growth? Laryngoscope **55**:62 (Feb.) 1945.

8. Cullom, M. M.: The Role of Sinusitis in Human Pathology, South. M. J. **37**:110 (Feb.) 1944.

9. Whitaker, J. G.: Sinus Disease and Natural Defenses, J. Laryng. & Otol. **58**:397 (Oct.) 1943.

10. Whitaker, J. G.: Sinusites e defesos naturais, Rev. brasil. de oto-rino-laring. **10**:485 (Sept.-Oct.) 1942.

11. Salinger, S.: Paranasal Sinuses, Arch. Otolaryng. **40**:301 (Oct.) 1944.

DIAGNOSIS

Law [12] lists 14 types of pathologic process in the cranium the diagnosis of which can be materially assisted by stereoscopic roentgenograms. The reasons why roentgenograms of this type are not employed more frequently are (1) that many technicians lack the training, (2) that the observer is unable to focus the images properly and (3) that there is added expense to the patient. The author describes a simple method whereby one may inspect such films without the use of double shadow boxes and still gain the proper perspective of a third dimension.

Adams [13] observed several cases in which iodized poppyseed oil 40 per cent instilled in the antrum was later seen to take on a "snow storm" aspect. The mass seemed to have become broken up into numerous fragments, dispersed throughout the sinus. It appeared that the oil had become admixed with thick secretion within the sinus, a condition that is difficult to reproduce experimentally. However, in 1 case he shows a roentgenogram in which a definite streak can be seen extending from the region of the middle meatus backward and downward into the pharynx. This could be only one thing, namely, a string of ropy mucus thoroughly mixed with the iodized oil. The author believes that fragmentation of the oil, when observed in the days following instillation, can be interpreted as an indication of ciliary stasis.

Coqui [14] maintains that contrast mediums are not used as frequently as they should be in the diagnosis of sinus disease. He employs a solution called Neoyodipina, which is light enough to be introduced easily by the displacement method. A number of illustrations are presented, showing the oil in the various sinuses and depicting various types of pathologic alteration.

Holvey and Rosenthal [15] discuss the advantages of tomographic over conventional roentgen films in the diagnosis of disease of the maxillary sinus. Tomograms of carcinoma reveal invasion of the bony walls and extension into adjacent areas much more clearly than do the usual projections.

12. Law, F. M.: Stereoscopic Versus Plain Films in Accessory Sinus Examinations, Ann. Otol., Rhin. & Laryng. **53**:531 (Sept.) 1944.

13. Adams, W. S.: Fragmentation of Radiopaque in the Diagnosis of Sinusitis or the Snow Storm Effect, J. Laryng. & Otol. **58**:340 (Aug.) 1943.

14. Coqui, C.: El método de Proetz en el estudio de los senos de la caro, Cir. y cirujanos **12**:41 (Jan.) 1944.

15. Holvey, E. H., and Rosenthal, L. M.: Tomography in the Region of the Maxillary Sinuses, Radiology **42**: 458 (May) 1944.

SINUSITIS IN CHILDREN

Wishart [16] presents an exhaustive analy sinusitis in children. He speaks with aut because of long experience in a children's pital where the patients have been give benefit of thorough study by the combined The author poses many questions dealing the anatomy and the physiology of the which are but lightly covered in the sta textbooks, and attempts to provide the an He discusses the turbinates, the mucosa blood and lymph supplies and the drainage ties of the sinuses in their relation to n function and points out the factors which h bearing on the incidence of infection.

Stress is laid on the necessity of taki accurate history. The parent or the gu of the child must be led by skilful questi to explain in detail the character of the symptoms, since the layman's interpretati in itself undependable and subject to wide tion according to temperament and other ences. Every symptom must be thor analyzed, so that the physician gets a clea ture of the course of the disease. The a mentions the symptoms and comments o in detail. The methods of examination a means of diagnosis are also covered in The author favors the use of the nasopha scope, which must be inserted at interva that the origin of secretion may be obs He believes in the value of contrast me introduced into the antrum by puncture suggests that the procedure should embra taking of three roentgenograms, one preli to instillation, one immediately after, a third about seventy-two hours later. T tails of therapeutics are too numerous abstracted adequately but are thoroughly in the paper. The author points out that of sinus disease in childhood fall into groups for therapeutic purposes: (1) th which the child can be referred back to the atrician with instructions as to home treat (2) those in which, in addition, the patient be seen by the rhinologist for special loca cedures, and (3) those in which the patient be hospitalized for surgical treatment.

The author advises against the use of ta and irrigation via the middle meatus, pref direct puncture below the inferior turb What to do for the child who cannot bl nose and how to employ nasal drops and a ister other forms of therapy are discussed and appraised on the basis of the author's experience.

16. Wishart, D. E.: Diagnosis and Treatm Sinusitis in Children, Laryngoscope **54**:97 (March

number of topics were discussed at twelfth annual meeting of the American demy of Pediatrics.[17] Simpson covered the ect of osteomyelitis of the superior maxilla rring in infants, reporting 2 cases in which ical exposure and drainage resulted favor- he also discussed ocular and orbital com- tions, osteomyelitis of the skull, particu- that which follows swimming and diving, meningitis.

n Alyea spoke of sinusitis in general, sing diagnosis and treatment.

nsell discussed allergy in relation to sinu- stressing again the importance of cytologic inations for proper diagnosis.

enekens took up the matter of sinusitis as m of infection in such conditions as chronic media, rheumatism and bronchopulmonary itions.

linger continued with comments on the ction between postnasal drip and chronic , stressing the value of treatment with vac- and occasional bronchoscopic aspiration. erning bronchiectasis, Holinger stated that experience the sinuses were at fault in only all proportion of cases.

ingston decried the local use of sulfon- compounds but conceded the value of their used internally in certain selected cases.

rdsall[18] asserts that he is able to examine asal chambers satisfactorily even in very children and that in many cases he succeeds posterior rhinoscopy. He therefore finds it le to diagnose sinusitis as readily in chil- as in adults. In a series of 80 carefully ved patients he found nasal obstruction the common symptom, with cough, colds, ano- and otorrhea next in order. The presence ucopurulent secretion in both the middle the inferior meatus is conclusive evidence us infection, in his opinion.

ssell[19] believes "it is wise to assume that inuses are involved in most of the exan- ta, influenza and pneumonia and to initiate tive treatment without delay." This he es by introducing a vasoconstrictor solu- by the Proetz displacement method, which ustrates in several beautiful diagrams. He neosynephrine hydrochloride 0.25 per cent ephedrine salt 0.5 per cent.

Sweet[20] states that in regard to infants the diagnosis of sinusitis is uncertain because of the difficulty in making an adequate examination. He believes that in most infants with this condition the drainage is postnasal and is frequently manifested by cough due to aspiration of the secretion. He favors postural drainage, mild suction and use of ephedrine in isotonic solution of sodium chloride without the preservatives which are usually contained in commercial preparations.

Clifford, Neuhauser and Ferguson[21] believe that infection of enlarged adenoids is responsible for sinusitis combined with bronchitis in many infants and young children. They have found the predominant types of organisms to be the beta hemolytic streptococcus, Pneumococcus and Staphylococcus aureus. The symptoms are persistent nasal obstruction, mouth breathing, snoring and paroxysms of coughing. There are frequent recurrences of fever with exacerbation of all symptoms. Complications such as cervical adenitis, ethmoiditis, osteomyelitis and mastoid infection have been noted. The authors recommend a roentgenographic procedure for outlining the extent of the adenoid mass. With a child of 2 a lateral projection is taken at 40 inches (101.5 cm.) with $\frac{1}{60}$ second exposure at 200 milliamperes and 60 kilovolts. An attempt should be made to take the roentgenogram at the moment when the most air is present in the nasopharynx, which would be at the beginning of the cry in an infant and on exhalation through the nose in an older child. The authors recommend giving the patient sulfadiazine for three days prior to operation. The tonsils, if enlarged or diseased, may be removed at the same sitting.

De Gunten and Arabian[22] observed bronchiectasis associated with chronic maxillary sinusitis in 3 children aged 6, 8 and 9. They are inclined to support Kartagener's theory of congenital weakness as the predisposing cause, and they consider the two conditions as developing simultaneously and not in the relationship of cause and effect. They predict good results in children if the conditions are discovered early and treated adequately; by this they mean drainage of the sinus and disinfection of the bronchial tract with iodized poppyseed oil 40 per cent, use of sodium benzoate and other measures.

Simpson, W. L.; Van Alyea, O. E.; Hansel, F.; kens, E. J.; Holinger, J., and Livingston, G. S.: Table Discussion on Sinusitis in Children, J. **24**:349 (March) 1944.

Birdsall, S. E.: Diagnosis and Treatment of Sinu- Children, Proc. Roy. Soc. Med. **37**:403 (June) 1944.

Russell, H. G. B.: The Recognition and Palliative ent of Early Sinus Trouble in Children, Proc. oc. Med. **37**:401 (June) 1944.

20. Sweet, C.: The Diagnosis and Treatment of Upper Respiratory Tract Infections in Infants and Children with Reference to Sinusitis, Bull. Vancouver M. A. **20**:268 (July) 1944.

21. Clifford, S. H.; Neuhauser, E. B. D., and Ferguson, C. F.: Adenoid Bronchosinusitis in Infants and Children, M. Clin. North America **28**:1091 (Sept.) 1944.

22. de Gunten, P., and Arabian, S.: Sinusites maxillaires chroniques et bronchectasies chez l'enfant, Pract. oto-rhino-laryng. **5**:229, 1943.

McMahon [23] discusses the general picture of sinus disease in children, stressing the pathologic factors, the causes and the symptoms. He recommends irrigation with isotonic solution of sodium chloride for the removal of tenacious secretion which cannot be evacuated by the patient. This procedure precedes the instillation of shrinking agents, which are thus permitted to come into direct contact with the tissues to be affected. He recommends a 1.5 per cent concentration of an ephedrine salt in saline solution or a 0.25 per cent solution of neosynephrine hydrochloride.

The general care of the patient is emphasized, and sulfonamide compounds are endorsed because of their being found in the tissues after having been taken orally. Thus their bacteriostatic effects may be helpful under certain conditions, provided adequate drainage has been accomplished.

Johnston [24] states that not all sinus diseases are amenable to the influence of a dry, warm climate. Such an environment is beneficial only to those types that are accompanied by excessive secretion. Should the secretion be scanty, the patient would be more comfortable where the humidity is relatively high.

For an antral infection which fails to yield to irrigation or which occurs in an uncooperative child, the author recommends the procedure described by Shea, in which an intranasal antrostomy is done and a small self-retaining catheter is left in the sinus long enough to permit frequent irrigation until the process has subsided.

Johnston, as well as McMahon, stresses the importance of cooperation between the rhinologist and pediatrician.

COMPLICATIONS, PULMONARY, INTRACRANIAL AND GENERAL

Davison [25] in an analysis of 50 cases of bronchiectasis is led to conclude that sinusitis plays but a minor etiologic role. Aside from other considerations, the mere fact of the small percentage of cases of bronchiectasis in relation to the vast number of cases of chronic sinusitis seems to prove his point. In his series he found 80 per cent of the patients showing evidences of hypersensitivity to various allergens. He surmises, therefore, that the edema of the bronchial mucosa due to this factor has a part in the production of atelectasis, which leads to bronchi tasis. In 72 per cent of his patients the sy toms developed in the first decade of life, the coexistence of the sinusitis may be attrib in large measure to the same allergic factor.

Richards [26] observed typical situs inv (Kartagener's triad) in a child of 7. The f had open tuberculous lesions, and there others with tuberculosis in the family. R genograms revealed the heart and the bron tree transposed, the frontal sinuses absent ethmoid and maxillary sinuses infected an middle lobe of the right lung bronchie There were evidences of primary tuberculo this child. The author believes the case sup Kartagener's theory that the origin of bronc tasis may be traced in most cases to a cong defect. He cites a report from the Mayo in which it is stated that 14 of a series patients with bronchiectasis exhibited t signs of the triad described by Kartagener.

A study by Courville [27] based on an an of 42 cases of subdural empyema in whic diagnosis was verified at autopsy is signi because it helps to clarify a pathologic hitherto only partly understood. It point the anatomic fact that the dorsolateral of the cerebrum presents an area remar free from attachments, thereby facilitating accumulation of fluid, under certain condi sufficient to depress the cortex and displac hemisphere. The subdural space in this vi is the site of purulent accumulations seco to infection of the frontal sinus, which m walled off by a neomembrane developing the living mesothelial cells. The most co channel by which the infection is carried the sinus to the subdural space was found the communicating veins. An active predi ing factor was frequently thrombosis o superior longitudinal sinus and superior ce veins. The question as to why the v method of propagation of the infection le a subdural accumulation rather than to an a in the cortex proper is answered by "the pe manner in which the superior cerebral vei pose themselves to the subdural space i course of their debouchment into the su longitudinal sinus and perhaps in the c character of the ultimate venous lesion."

The author presents a number of illustr taken from autopsy specimens showing the

23. McMahon, B. J.: Treatment of Sinusitis in Children, Ann. Otol., Rhin. & Laryng. **53**:644 (Dec.) 1944.

24. Johnston, W. H.: Nasal Sinus Disease in Children: Its Diagnosis and Treatment, Ann. Otol., Rhin. & Laryng. **53**:660 (Dec.) 1944.

25. Davison, F. W.: Does Chronic Sinusitis Cause Bronchiectasis? Ann. Otol., Rhin. & Laryng. **53**:849 (Dec.) 1944.

26. Richards, W. S.: Sinus Inversus Viscerum sent Frontal Sinuses with Ethmoid and Maxillary tion, and Bronchiectasis: Kartagener's Triad, T **25**:27 (March-April) 1944.

27. Courville, C. B.: Subdural Empyema Sec to Purulent Frontal Sinusitis, Arch. Otolaryng. (March) 1944.

and the distribution of the purulent accumu-
ns. In most cases the pus "extends well
n toward the curved inferolateral margin of
rontal lobe and into the sylvian fissure." It
extend even farther along the fissure toward
ase in the region of the chiasm. Less com-
directions of spread are also described.
he clinical signs of this important complica-
are divided into "those indicative of a con-
tional reaction, evidences of increased intra-
al pressure, signs of meningeal irritation
localizing symptoms and signs indicative of
eat of pressure." Much depends, of course,
he location and the amount of the purulent
late. The temperature is generally high,
chills have been noted in less than one fourth
he cases. Changes in the optic disks were
ent in about one fourth of the cases. Cor-
irritation is suggested by delirium rather
coma. Considerable amounts of pus will
lly give rise to signs of pressure, such as
or and increased manometric readings.
lizing symptoms due to cortical pressure
ksonian seizures and local muscular twitch-
were noted in 14 of the 42 cases. Contra-
al motor weakness or paralysis was seen
6 cases and abnormal contralateral reflexes
Among 27 cases of lesions of the left side.
r aphasia was noted in only 6.
ubdural abscess should be suspected in cases
ute frontal sinusitis when signs of meningeal
tion follow closely on the initial local symp-
. It is a more likely complication than corti-
bscess in the absence of a slow pulse and a
r temperature. Generalized meningitis is to
xcluded by examination of the spinal fluid.
he author points out that this condition is
e and rapidly progressive and unless relieved
rompt surgical drainage will sooner or later
me fatal meningitis. It is four times as
mon as abscess of the frontal lobe, although
is more frequently diagnosed in cases in
h intracranial involvement is suspected.
ullom [28] is impressed with the vital etiologic
which sinusitis may play in serious consti-
nal deterioration and remote infections,
g cases of herpes, pyelitis, repeated attacks
neumonia, heart disease and other diseases
which a previously undisclosed or inade-
ely treated sinusitis was found to be the
e.' The case histories cited by Cullom are
ing evidence in support of his thesis. Cul-
quotes at length from an editorial which
ontributed to the *Medical World*, of Phila-
hia, in which he discussed the handicap
er which the sinuses of the human being
perform their function, these handicaps being the result of the evolution of the quadruped into the biped. He is convinced that proper methods of examination will disclose in many patients chronic sinusitis which requires therapy. He also feels that from the therapeutic standpoint intranasal antrostomy offers excellent prospects for a cure by establishing permanent drainage in a dependent location.

Concerning the ethmoid sinus he states that he finds it impossible to exenterate this labyrinth thoroughly without removing the middle turbinate. In an extensive experience, covering thirty years, he has not observed that crusting follows this procedure as asserted by many. When crusting does occur, it is due to remaining infected cells.

ORBITAL COMPLICATIONS

Morrison [29] reports a series of 39 cases in which optic neuritis was treated by intranasal exenteration of the ethmoid sinus, with 18 of the patients showing complete recoveries and 14 at least 50 per cent improvement. The procedure employed was high resection of the nasal septum, displacement of the middle turbinate medially and as thorough cleaning out of the ethmoid cells as was possible. The turbinate was then pushed back into the operative ethmoid space to permit inspection of the ostium of the sphenoid sinus. If the latter was found adequate, the sphenoid sinus was not opened, since it was found in most cases that this part of the procedure was unnecessary. As a rule, the amount of pathologic change observed in the ethmoid sinus was minimal, consisting of the presence of a few small isolated polyps.

All cases were thoroughly investigated for other possible etiologic factors before the sinuses were operated on. Among the 9 cases with failures of treatment were 5 in which the etiologic basis was later discovered to be in some condition outside the sinuses, viz., familial optic atrophy, thrombosis of the central vein, chronic intracranial pressure and hysteria; in 1 case there were numerous other neurologic findings. These cases are cited as a caution against overenthusiasm for surgical intervention.

Hardy's case [30] was extremely interesting from two points of view, pathologic and surgical. Optic neuritis developed in a woman of 34 about six months after a Caldwell-Luc operation, which had been necessitated by chronic maxillary sinusitis of dental origin. Although the roent-

Cullom, M. M.: The Role of Sinusitis in Human
ology, South. M. J. **37**:110 (Feb.) 1944.

29. Morrison, L. F.: Optic Neuritis and the Ethmoid Sinuses, J. Nerv. & Ment. Dis. **99**:786 (May) 1944.

30. Hardy, G.: Maxillary Sinusitis with Optic Neuritis, Am. J. Surg. **66**:126 (Oct.) 1944.

gen examination revealed no pathologic condition in the sphenoid and the ethmoid sinus and irrigation of the antrum operated on gave a negative result, it was deemed advisable to explore the sinus again and open the ethmoid and the sphenoid sinus transantrally. The operation disclosed a fibrous mass filling most of the antrum and enclosing a cystic cavity containing pus. The ethmoid and sphenoid sinuses were normal. The patient recovered.

(Comment: It is evident that the negative result from irrigation of the antrum was due to the fact that the irrigated space represented only a portion of the sinal cavity. Also it is apparent that the mere maintenance of a permanent antrostomy is no guarantee against residual infection, which in this case was due to the ingrowth of fibrous tissue from the tissue overlying the opening in the canine fossa. How to prevent such an occurrence needs investigation. S. S.)

Berruecos [31] reports the following case. A young woman stated that a week previously she had suffered from a severe toothache necessitating the extraction of an upper molar tooth. A nasal discharge developed, with severe pains in the face and the head, edema of the face, the lids and the forehead, exophthalmos and rigidity of the neck. Spinal puncture revealed fluid under pressure; the Pandy test was positive, and the fluid showed 185 cells but no bacteria. Roentgenograms demonstrated that the ethmoid and frontal sinuses were clear. Therefore, surgical intervention was confined to the antrum, which was found to contain pus and a fungoid degenerated mucosal lining. Large doses of sodium sulfapyridine were given intravenously for several days. Later sulfadiazine was substituted. Bacteriologic examination of the spinal secretion revealed staphylococci, nonhemolytic streptococci and Micrococcus catarrhalis. The patient recovered.

Ford [32] observed 5 patients with optic neuritis, which in 3 of them lasted two, three and twenty-nine years, who recovered after drainage of the sinuses had been established. She argues that the impaired vision in such patients should be more properly termed "pressure paresis of the optic nerve" rather than "retrobulbar neuritis" because the improvement that follows the unlocking of the infected sinus is too prompt. In her opinion the loss of vision is due to edema of the tissues surrounding the nerve, causing pressure.

Ford [33] reports the case of a medically trained woman in whom unilateral blindness had been present for twenty-nine years. She could count fingers at 1 foot (30.5 cm.) in the outer part of the field only. Treatment of gingivitis was followed by evidence of improvement. Examination then revealed a nasal discharge, which led to direct treatment of the sinuses, with improvement of vision. After a number of weeks the condition cleared up almost completely, with contraction of the blind field to a mere 3 mm. The author attributes the amblyopia to edema of the optic nerve based on irritation due to products from the infective focus in the sinuses.

Folk and Brunner [34] explain that the location of the initial edema of the lids often discloses the sinus from which the infection originates. In the lower lid edema points to the maxillary sinus; in the upper lid, to either the ethmoid or the frontal sinus; in the former it extends above the frontal process of the superior maxilla, localizing above the internal palpebral ligament. The swelling due to dacryocystitis is found below this ligament. Three types of inflammatory reaction may occur if the orbit is invaded: circumlateral edema of the orbit, subperiosteal abscess and orbital phlegmon. The first two usually subside with conservative treatment or simple incision. The prognosis of orbital phlegmon is more doubtful, since it is often difficult to determine whether suppuration has ensued or whether the larger veins are thrombosed.

OSTEOMYELITIS

Kazanjian and Holmes [35] present an interesting and thorough study of the plastic repair of deformities of the frontal region resulting from operations for the cure of osteomyelitis. The study is based on their experiences in a series of 38 cases of various types and degrees of deformity in which a variety of substances were employed. Bone, cartilage, vitallium, tantalum and an acrylic substance were used at various times, and the relative values of these substances are thoroughly discussed in connection with the various deformities encountered and the various indications in different cases. The authors state that viable tissues should be used wherever possible in preference to foreign materials. Cartilage is desirable for filling in smaller defects and bone taken from the tibia may be employed for defects up to 2½ inches (6 cm.) in diameter. It is also preferable in children because of

31. Berruecos T., P.: Sinusitis maxilar con celulitis orbitaria y reacción meningea: Curacion, An. méd. **4**:13 (Oct.-Dec.) 1943.

32. Ford, R.: Retrobulbar Neuritis, Brit. J. O. **28**:511 (Oct.) 1944.

33. Ford, R.: The Amblyopic Eye: Recovery after Twenty-Nine Years by Drainage of the Para-Nasal Sinuses, Clin. J. **73**:65 (March-April) 1944.

34. Folk, M. R., and Brunner, H.: Orbital Complications in Paranasal Infections, Eye, Ear, Nose & Throat Monthly **23**:339 (Sept.) 1944.

35. Kazanjian, V. H., and Holmes, E. M.: Reconstruction After Radical Operation for Osteomyelitis of the Frontal Bone, Surg., Gynec. & Obst. **79**:397 (Oct.)

ood of some regeneration taking place in mplants to keep pace with the growth of kull.

larger defects, plates of vitallium, an acrylic nce, and tantalum serve well to fill the void rotect the brain and are well tolerated by ssues. They all have to be cast from models preoperatively and are not capable of much tion at the time of implantation. There- much skill and care are required in the ration of the models. The authors present etails of the operative technics in various of cases, with adequate illustrations, which xtremely helpful.

a case reported by Williams and Nichols,[36] ding osteomyelitis of the frontal bone de- ed in a child of 9, which was caused by pan- itis. At the time of the child's admission e clinic the process had been developing o weeks and had reached the stage of con- ns, high temperature, swelling over the l area and a blood culture showing a th of Staphylococcus aureus. He was given 0 Oxford units of penicillin by the con- us intravenous method for twenty-four and then similarly 33,000 units per day for days. The external swelling was incised, ling an abscess. Later this was explored r; the bone was necrotic, and a large extra- abscess was uncovered. Healing was com- within a month.

a second case osteomyelitis developed in n of 35, following an intranasal antrostomy, nvolved the malar, nasal and frontal bones. as characterized by remissions under inci- and drainage and the local use of zinc ide and sulfadiazine. Anaerobic short streptococci were isolated from the dis- e. Since this treatment failed to halt the ess of the disease, the patient was given 0 units of penicillin by intravenous drip twenty-four hours for eight days. Im- ement was noted within twenty-four hours the onset of penicillin therapy and con- d to complete recovery.

Comment: Since the details of the surgical ment are lacking in the report, it would be esting to know whether less than the usual al methods generally advised were em- d, with reliance on simple drainage alone, ew of the prompt efficacy of penicillin. S. S.)

rown[37] reports his observations in a series cases of osteomyelitis of the frontal bone. Two of the patients died as a result of extensive subdural abscess. This complication is serious because of the absence of characteristic warning symptoms until too late. The author holds that as a rule extensive surgical excision is necessary for a cure and describes osteotomy carried beyond the infected area. He states that although roentgen examination produces positive evidence only after days, it is nevertheless worth while and at times the result is a deciding factor. The surgical defect in the skull may be repaired by use of an autogenous bone transplant, cartilage isografts, or a vitallium plate. One case in which the last-named was used is described and illustrated.

Otte[38] reports 12 cases of osteomyelitis of the frontal bone, in 7 of which it was localizing, in 2 spreading and in 3 fulminating. The localizing type was due to such occurrence as trauma or an exanthem. There was no evidence of sinus infection in cases of this type; they were characterized by an acute onset, with fever, pain and local edema, followed by a protracted period in which local necrosis and sequestration took place. The author stresses the importance of repeated roentgen examination in these cases since in some of them the disease tends to spread cranially rather than externally.

The typical spreading osteomyelitis is easy to recognize, because of the coincident involvement of the sinuses, and is the type in which extensive resection of the bone is indicated.

The fulminating type may occur as typical massive bony necrosis, due to rapid spread through the diploe, or it may take the septic form in which the infection spreads rapidly by way of the venous communications. Extensive surgical excision may help in the former, but in the latter one would have to rely on sulfonamide compounds and penicillin until there was definite evidence of localization or of sufficient resistance on the part of the host.

Putney[39] found penicillin effective in the treatment of osteomyelitis originating in the sinuses and reports 7 cases in which the patients were cured. In 5 the frontal bone was involved, in 1 the frontal bone and the superior maxilla and in 1 the superior maxilla. In addition, he reports 2 cases in which orbital cellulitis was similarly treated with good results. In 7 of the 9 cases a surgical procedure was necessary. The author holds that the optimum time for operation is the period when the infection has been halted by the penicillin, although in some cases

Williams, H. L., and Nichols, D. R.: Spreading omyelitis of the Frontal Bone Treated with Peni- Proc. Staff Meet., Mayo Clin. **18**:467 (Dec. 1)

Brown, L. A.: Osteomyelitis of the Frontal Bone, Otolaryng. **39**:485 (June) 1944.

38. Otte, J.: Osteomielitis del hueso frontal, Rev. otorrinolaring. **4**:4 (June) 1944.

39. Putney, F. J.: Uses of Penicillin in Diseases of the Nose and Throat, J. A. M A. **126**:620 (Nov. 4) 1944.

healing may take place without resort to operation. He states that one to two weeks may elapse before it can be determined whether surgical intervention will be necessary. The longest period of treatment was in a case of osteomyelitis of the upper jaw and frontal bone; 7,370,000 units was administered over a period of sixty-six days, and finally radical removal of the frontal bone was resorted to.

In a few cases of chronic maxillary sinusitis in which penicillin was used it was found that the discharge could be sterilized but that the hyperplastic membrane could not be reduced and had to be removed surgically. In cases of acute sinusitis a few irrigations with a solution of a penicillin salt (250 units per cubic centimeter) proved successful.

Penicillin proved to be most effective in 2 cases of osteomyelitis reported by Iglauer.[40] In the first case the frontal sinuses were involved, the infection following a blow on the forehead a few days previously. Edema, pain, a high body temperature and a stuporous state were noted on admission. Thrombosis of a cavernous sinus was suspected. The blood culture showed the presence of Staphylococcus aureus. Treatment with a sulfonamide compound and simple trephination drainage of the frontal lobe were ineffective. Penicillin was given (10,000 units) intravenously every four hours shortly after a more radical exposure had revealed extensive involvement of the bony walls of both the frontal sinuses. Within forty-eight hours, the blood culture was negative, and the clinical symptoms began to abate. Recovery was complete, and the wounds healed within three weeks. The dosage of penicillin was reduced to 5,000 units every four hours five days from the time it was started, and was discontinued entirely on the seventh day.

In the second case, a boy of 3½ years began to have fever, anorexia and edema of the face and orbit twelve days after a fall. Examination indicated a diagnosis of extensive infection of the antrum and of the palate, which was corroborated at operation. Blood cultures showed a hemolytic type of Staphylococcus aureus. A sulfonamide compound was ineffective, and on the fourth day, when the patient's condition was critical, a change was made to penicillin. He was given 5,000 units intravenously every four hours until a total of 100,000 units had been given. He became afebrile in a week, and the improvement was steady and continuous.

Colbert[41] employed penicillin in 3 cases of spreading osteomyelitis of the frontal bone with gratifying results. He points out the neces of adequate drainage in all cases but believes extensive surgical treatment is not require often under penicillin therapy as it was viously. He also stresses the importanc continuing local instillations of a solution salt of penicillin even after cessation of paren injections and states that the wound shoul kept open until at least two sterile cultures been obtained.

Kirby and Hepp[42] used penicillin in 4 of osteomyelitis and concluded that it is im tant to use large doses. They recommend 200,000 units be given daily by continuous in venous drip for ten days to two weeks, follo intramuscularly by 15,000 units every hours (120,000 units daily) for another or three weeks. It is important to cont penicillin therapy postoperatively until it is tain that all foci have been eliminated. penicillin it is possible to postpone sur treatment until sequestration has become m fest, thus facilitating the surgical procedure obviating the necessity of subsequent sur procedures. The organisms isolated in the cases were anaerobic nonhemolytic streptoc

Cluff[43] reports a case in which osteomye of the frontal bone developed slowly ov period of two or three months without any history of a previous acute episode or tra It was characterized by brief remissions u palliative therapy until finally the swelling f to disappear, and roentgen examination sho diffuse involvement of the right half of frontal bone following the course of the fr diploetic vein. Recovery occurred after surgical exposure with removal of diseased b and of the mucosa of the affected frontal si

(Comment: There is no mention of r genograms taken during the first two per in which the patient was in the hospital senting definite swelling and tenderness. S.

In Brody's[44] case osteomyelitis followe sinus infection due to swimming. The pa was a girl of 19 whose symptoms appeared days after the swimming. Headache, vom and swelling of the lids prompted a spinal p ture, which revealed fluid under pressure. 980 cells per cubic centimeter. Edema increa

40. Iglauer, S.: Two Cases of Osteomyelitis Treated with Penicillin, Laryngoscope **54**:150 (March) 1944.

41. Colbert, R. M.: Osteomyelitis of the Fr Bone Treated with Penicillin, Ann. Otol., Rhi Laryng. **53**:522 (Sept.) 1944.

42. Kirby, W. M. M., and Hepp, V. E.: Treat of Osteomyelitis of the Facial Bones with Penic J. A. M. A. **125**:1019 (Aug. 12) 1944.

43. Cluff, J. W.: The Complications of Acute Fr Sinusitis with Report of a Case, Bull. Vancouver **20**:105 (Jan.) 1944.

44. Brody, B. S. : Osteomyelitis of the Skull necticut M. J. **8**:421 (July) 1944.

ading to the zygomatic and temporal re-
s. The ocular bulb was proptosed, and
pus was found in both sides of the nose.
blood culture was positive for a hemolytic
of Staphylococcus. A bile-soluble diplo-
us was isolated from the spinal fluid. The
ingeal symptoms increased, and the patient
into a stupor and manifested weakness
twitching of the right side of the face and
right arm.

retrobulbar abscess was incised and drained.
n days after admission, roentgenograms re-
d osteomyelitis of the frontal bone. The
ted area was exposed by a coronal incision
in the hair line with the flap reflected for-
d. The left half of the frontal bone was
oved, the sinus was opened and drained and
xtradural abscess was uncovered. The pa-
recovered. Sulfadiazine was given for
t two weeks.

he history of fulminating osteomyelitis of
rontal bone in a boy of 14 is given in detail
ther with the autopsy report by Kelemen.[45]
llateral involvement of both mastoid proc-
s and tympanic cavities evokes a discussion
the route of the infection from the frontal
e temporal bone. The author shows that the
way extended directly from the original focus
he zygomatic portion of the frontal bone by
of the parietal bone to the pneumatized por-
of the temporal bone, where the osteomyelitic
ess gave way to a pneumatic-otitic one.
maintains that the defense mechanism which
lops in the pneumatic system tends to limit
further spread of the osteomyelitic process,
h accounts for the infrequent mutual involve-
t of frontal and temporal bones in the same
of pathologic process.

MALIGNANT TUMORS

avens and Thornell [46] find that in many cases
ancer of the nasal cavity with probable inva-
of the sinuses the process is not easily
eated preoperatively as to point of origin
extent. This applies particularly to those
s in which the lesion is found within the
l chambers. They offer an external ap-
ch which yields adequate access for inspec-
and thorough exenteration of the neoplasm.
similar to the classic Mouré operation but
extensive. The incision begins under the
1 cm. lateral to its internal extremity and
is carried medially and downward midway between the inner canthus and the summit of the nasal dorsum, following the nasofacial sulcus to just below the free border of the nasal bones. (Comment: This incision is similar to that described by Patterson in connection with polyposis; the latter's description is abstracted elsewhere in this review. S. S.)

The incision is carried through soft tissues and periosteum to bone. The periosteum is elevated as far as the middle of the nasal bridge and laterally to the lacrimal bone. The sac is lifted out of its bed and the lamina papyracea exposed. The mucosa on the under surface of the nasal bone is freed, the separation beginning at the lower end of the bone; thus the latter is freed of its coverings, both internal and external. Portions of the nasal bone and of the superior maxilla are removed in sufficient amount to afford access to the nasal interior through an incision of the mucosa parallel to the incision of the skin. The tumor is thus exposed and can be followed to its origin, whether it is strictly intranasal or is extending into the ethmoid labyrinth or the antrum. If the latter is extensively invaded, it should be opened sublabially in addition. After removal of the mass, its point of attachment is destroyed with the electrocautery and radium is inserted and held in place with packing. The packing and the radium are so arranged that they can be removed through the nose, thus permitting primary closure of the external wound. Eight cases are cited.

Reviewing a series of 92 cases of malignant tumor of the sinuses, Robinson [47] found a three year survival rate of 20 per cent. He emphasizes the importance of histologic examination of tissue removed from the sinus whatever the type of surgical procedure, since frequently one will encounter a malignant growth at a stage so early that it previously has been unsuspected. In most cases the diagnosis is made by correlating the clinical findings with the roentgen evidence, since in some instances the roentgen pictures will not be conclusive.

For early cancers he advises operation and postoperative irradiation, except the anaplastic types, which he believes should receive preoperative irradiation.

Athle [48] reports the incidence of carcinoma of the antrum as determined from the records of the Tata Memorial Hospital (Bombay, India)

Kelemen, G.: Collateral Infection of the Temporal Bone in Fulminating Osteomyelitis of the Frontal, Laryngoscope **54**:76 (Feb.) 1944.

Havens, F. Z., and Thornell, W. C.: Malignant Tumors of the Nasal Cavity, Arch. Otolaryng. **40**:396 (Nov.) 1944.

47. Robinson, G. A.: Diagnosis, Treatment and End Results in Malignant Tumors of the Nasal Sinuses, New York State J. Med. **44**:713 (April 1) 1944.

48. Athle, L. H.: Carcinoma of the Antrum, M. Bull., Bombay **12**:245 (June 17) 1944.

as 1 per cent of all cancers. The initial symptoms recorded in 55 cases were pain and swelling in 23, nasal bleeding in 8, toothache in 7, ulceration of the mouth in 6, ocular symptoms in 3 and trismus in 3. Of the 55, 38 were instances of squamous or epidermoid carcinoma. Thirty-six of the patients received treatment: 20, roentgen irradiation alone; 11, antrotomy and implantation of radium; 4, antrotomy and roentgen irradiation, and 1 implantation of radium and roentgen irradiation.

The follow-up was not satisfactory because of the fact that many of the patients came from remote rural districts and could not be reached.

Bajkay [49] reports a case of sarcoma involving the maxillary, ethmoid and sphenoid sinuses, which attained such a size as to fill the nasal cavity. It pushed the septum to the opposite side, reached the posterior choana and caused marked displacement of the eye. The mass was removed via a Denker approach. It weighed 97 Gm. Section showed it to be a polymorphocellular alveolar sarcoma. A course of roentgen therapy followed. The patient was alive and well two years later. He died at that time of an intercurrent disease.

Statistical data are presented, showing the relative infrequency of this tumor and the relatively good prognosis.

Vetter [50] quotes Ringertz and Berven on the incidence, the distribution and the prognosis of carcinoma of the sinuses. He points out that carcinoma simplex and adenocarcinoma are more frequently seen in younger persons (20 to 39), whereas the squamous and basal cell forms are encountered later in life. Experience has shown that the best method of dealing with these tumors is a combination of surgical and electrosurgical procedures and irradiation. Two cases are cited. In the first a transitional cell carcinoma of the antrum was treated by radical excision, after preliminary ligation of the external carotid artery, and then by intramural implantation of radium. The patient was free from evidence of disease when seen seven years later.

The second case was that of a squamous cell tumor which was removed via a Caldwell-Luc procedure. The primary result was good.

An article by Valencia and Rosenthal in *Radiologia* [51] is a reprint from the *American Journal of Roentgenology*.[52]

49. Bajkay, T.: Ueber ein enorm grosses Nebenhöhlensarkom, Pract. oto-rhino-laryng. **5**:83, 1943.

50. Vetter, H.: Zur Kasuistik des Nebenhöhlencarcinoms, Pract. oto-rhino-laryng. **5**:250, 1943.

51. Valencia, E., and Rosenthal, L. M.: Radioterapia del cáncer del antro maxilar, Radiología **6**:141 (July-Aug.) 1943.

NONMALIGNANT TUMORS

Millhon and Brown [53] describe a nonsecr cyst of the maxillary sinus frequently see dental roentgenograms. It usually appears a opaque dome-shaped mass clearly outlined ag the radiolucent antrum. A case is reporte which the cyst was observed over a period o years without a material change being seen. other cases the cyst has been noted to disap in time. An examination of 600 consecutive tal roentgenograms revealed 24 cases of this of cyst. Most authors feel that this type is to accumulation of tissue fluids in an edem area and has no truly formed wall.

Grossman and Waltz [54] encountered 13 of probable simple cyst of the antrum in a s of 80 consecutive roentgen examinations. T state that this cyst arises in the subepith connective tissue as a result of bacterial i causing an upset in the water-balancing me nisms of the tissues. As a rule it gravi toward the floor of the sinus and may at t completely fill the cavity. The symptoms not constant; frequent colds, malaise and o sional pain in the teeth have been noted. P ture of the antrum may yield no evidence u the trocar penetrates the wall of the cyst which case a thin clear straw-colored fluid appear, which seldom contains bacteria. In cases the outline of the cyst wall can be made in the pictures. Transillumination is usually revelatory. Roentgenograms made after i lation of iodized oil frequently assist in deli ing the outlines of the cyst.

The authors present a number of roent ograms showing the various types of cysts countered. Also they present a few diagn points by which these cysts can be differenti from such conditions as dental cyst, muco and carcinoma.

Straus [55] reports a series of 25 cases of of the antrum, in 15 of which the cyst removed through the Caldwell-Luc appro In 14 of these a mucosal cyst had been res sible for recurring headaches and was diagn mostly by means of roentgenograms made injection of a contrast medium. In some stances puncture of the antrum released a ty

52. Valencia, E., and Rosenthal, L. M.: Radiothera Cancer of Antrum, Am. J. Roentgenol. **48**:672 (Nov.)

53. Millhon, J. A., and Brown, H. A.: Cysts Ar from the Mucosa of the Maxillary Sinus as Seen Dental Roentgenogram, Am. J. Orthodontics (Jan.) 1944.

54. Grossman, J. W., and Waltz, H. D.: Secreting Cysts of the Maxillary Sinuses, Am. J. R genol. **52**:136 (Aug.) 1944.

55. Straus, G. D.: Mucosal Cysts of the Maxi Sinus, Laryngoscope **54**:267 (June) 1944.

yellow serous fluid. The author described types of mucous cyst, the secreting and the secreting, and states that in many cases they multiple. The secreting cyst is the result bstruction of a duct with subsequent dilata- and the nonsecreting cyst is due to an mmatory process causing damage of capil- walls with consequent outpouring of fluid the tissues. The author quotes MacGregor Lindsay on this point.

ccording to Boku [56]:

e origin of post-operational cystoma (of Kubo,) which frequently appears on the jaw after a ical operation for chronic sinusitis of the maxilla experimentally ascertained with cats. Group I con- g of 14 cats were operated on the maxillary sinus which the mucosa was completely scraped off and ved. In group II of 18 cats . . . the mucosa was n the sinus. In Group III of 15 cats the mucosa was ally scraped off. The results showed that cystomas loped in Groups II and III, when the ablated mucosa n the sinus became surrounded by scar tissue which ucted the drainage of mucus secreted inside, or the regenerated mucosa became wrinkled and the invaded the surrounding connective tissue. Neither stitial cells nor endothelial cells participated in the oma formation, nor did glandular tissue develop into toma. In group I the operated sinus was completely d up and healed with no development of cystoma. refore, the undesirable postoperational sequela of ical treatment of sinusitis maxillaris chronica can be ented by a careful removal of the mucosa at the time e operation.

oodyear [57] believes that mucoceles can be ted simply through an intranasal surgical edure without the necessity of external inci- and eradication of the sac. He insists that the helial lining of the sac is much better than which a surgical procedure can produce and once the opening into the sac is made large gh to insure its permanence, all of the symp- s will subside. When the ocular bulb is dis- ed by pressure of the inner orbital wall he found it easy to correct the deformity by sing a finger against the thin displaced bone. he operation consists in splitting a cystic dle turbinate, if this is present, and removing lateral one half. Then the floor of the ethmoid a or the anterior ethmoid cell is opened, asing the fluid. The opening is enlarged as as possible without injuring the lining of cyst cavity.

etter [58] observed a mucocele in a man of t 50 who gave a history of being struck the root of the nose by a piece of wood in 1922. Within a year, a small mass appeared, which remained stationary until 1939, when it began to increase in size rapidly. Photographs show a large smooth mass over the right side of the nasal bridge. It was exposed and found to contain a grayish green thin fluid. The cavity was lined with a smooth membrane. No communication with the nasal cavity was discovered.

Dodds [59] presents photographs of a Nigerian native with a dilatation which on superficial examination appeared to be a mucocele of the antrum. Since aspiration of the prominent area was not permitted, and since roentgenograms were not taken, the diagnosis could not be confirmed. The patient did not seem to be worried or in pain, and further studies had to be deferred in view of the local attitude toward surgical investigation.

Hanley,[60] reporting a case of osteoma, states that the two types usually seen, namely, the solid and the cancellous, are usually distinct and that they do not represent different stages of development. The structure of each type remains the same regardless of the age of the growth.

His case was unusual in that there was enophthalmos on the affected side rather than the usual exophthalmos; also there was a history of trauma occurring several months earlier. Another unusual feature was the presence of three distinct tumors occupying both frontal sinuses, causing erosion of both infraorbital ridges and the floor of one sinus, encroaching on the orbit. Both types of tumor were present in this patient.

González Loza and Imbern [61] describe osteoma of the ethmoid sinus in a man of 51, who gave a history of trauma of the orbit occurring at the age of 12, which was attended by nasal hemorrhage and edema. The symptoms disappeared in about ten days, and the patient had no discomfort until years later, when he began having ocular symptoms, such as local swelling, lacrimation, edema and pain. Examination revealed a large mass filling the entire ethmoid sinus and extending into the orbit and the nasal cavity. Because of obstruction, the sinal osteoma and the antral, ethmoid and frontal sinuses were all infected and discharging pus. The mass was removed through an external incision.

Boku, E.: An Experimental Study on the For- on of Post-Operational Cystoma of the Jaw, Huku- acta med. **33**:1 (Jan.) 1940; abstracted, Far East. Bull. **3**:50 (Dec.) 1943.

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59. Dodds, G. E.: Mucocele of Maxillary Antrum, Brit. J. Ophth. **28**:510 (Oct.) 1944.

60. Hanley, J. S.: An Unusual Case of Osteoma of the Nasal Accessory Sinuses, Laryngoscope **54**:235 (May) 1944.

61. González Loza, M., and Imbern, S. R.: Osteoma etmoidal con propagación orbitaria, Rev. otorrhinolaring. d. litoral **1**:85 (Sept.) 1941.

Tato and Bergaglio [62] report a case of osteoma involving the antrum with prolongations into the ethmoid sinus, the orbit and the pterygomaxillary space. The symptoms were radiating pains and slowly developing exophthalmos. The mass was removed piecemeal via a Denker approach, and the patient made an uneventful recovery.

Fernández del Moral, Codinach and Pereiras [63] report a case of fibro-osteoma of the frontal sinus in a child of 7. There were no subjective symptoms. Objectively there was slight exophthalmos, which had been developing since the age of 2, the ocular bulb being displaced outward and downward. The mass was removed through an external incision and was found to have eroded the posterior wall, exposing the dura, which was intact. The sinus was not infected.

For the correction of a deformity resulting from the removal of a frontal osteoma from a young man, Conley [64] employed a tantalum implant with excellent cosmetic results. The tumor occupied the lower portion of the frontal sinus, obliterating the inferior plate and pressing on the ocular bulb. It completely filled the sinus and was removed in two portions. It was composed of both cancellous and eburnated bone and was vascular in areas.

Hara [65] reports 3 cases of ossifying fibroma. This is apparently a rather rare clinical entity, occurring mostly in young adults. It is not to be confused with osteitis fibrosa, since there is no disturbance in calcium or phosphorus metabolism. It is a slow-growing tumor, usually involving one side of the superior maxilla and invading the antrum and the alveolus. Eventually it attains sufficient size to cause external deformity. There is no tendency to metastasize, and it rarely gives rise to symptoms until sufficiently large to attract the patient's attention. Roentgen studies may assist in the diagnosis, although it is pointed out that the mass may appear either circumscribed or diffuse, depending on the extent of the osseous development. Histologically, the sections show areas of abnormal bony trabeculae scattered throughout the connective tissue. These are composed of osteoid tissue rather than of adult bone, there being no real bone marrow but rather spaces filled with amorphous tissue in various stages calcification. The author presents a num of histologic sections that show various st in the development of the ossifying proces

The therapy recommended includes ra excision if the tumor is circumscribed, and c servative surgical treatment if the mass has vaded the alveolus. The tumor is resected d to the dental roots. Cauterization or impla tion of small doses of radium has been emplo postoperatively. It is better to take a ch of recurrence, which is expected in only 15 cent of the cases, than to sacrifice too much the alveolus and the palate, necessitating manent use of a prosthesis.

Simpson, Graham and Sanders [66] encounte a large fibroma in a Negro of 63, which invol the frontal and ethmoid sinuses; it invaded orbit, displacing the bulb, and eroded the p terior wall of one ethmoid sinus and bec attached to the dura, a section of which ha be removed with it. All of the sinuses w infected. The illustrations reveal an exten cavity resulting after removal of the mass. a subsequent operation the sphenoid sinuses w opened and drained. Severe hemorrhage ne sitated ligation of the internal carotid art The patient recovered.

Mosher's patient,[67] a man of 61, gave a hist of having been struck over the left maxilla a three months previously. There were p swelling and nasal obstruction. Examinat revealed that the nasoantral wall had b pushed medially and the hard palate slightly pressed on the affected side. Roentgenogra showed the antrum filled with a large mass, wh appeared to be eroding the anterior wall. T was found to be the case at operation. T entire antrum was filled with a large spo mass. Severe bleeding occurred, which ne sitated packing and suspension of further s gical removal. Histologic examination reve glandular adamantinoma. At a second operat the external carotid artery was ligated and remainder of the mass removed, which measu 3 by 3 by 5 cm. There had been no recurre up to two years after the last operation.

Further questioning elicited the informati that the patient had had a third molar to removed five or six years previously, at wh time, he was informed, the dentist curetted a s cyst which he had located at the base of the to

62. Tato, J. M., and Bergaglio, E. O.: Osteoma etmoideo-maxilar con exoftalmia, Rev. otorrhinolaring. d. litoral **2**:100 (Dec.) 1942.

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65. Hara, H. J.: Ossifying Fibroma of the Superior Maxilla, Arch. Otolaryng. **40**:180 (Sept.) 1944.

66. Simpson, W. L.; Graham, D. G., and San S. H.: Fibroma of the Ethmoid and Frontal Re with Case Report, Ann. Otol., Rhin. & Laryng. 5 (June) 1944.

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Abstracts from Current Literature

Ear

AIR OF PERIPHERAL INJURIES OF THE FACIAL NERVE. C. MARTIN, J. Nerv. & Ment. Dis. **99**:755 (May) 944.

rly attempts at repair of the peripherally injured l nerve utilized the hypoglossal and spinal accessory es for the proximal segments and the facial nerve he distal portion. If no proximal segment of the l nerve can be found, this operation is useful, al- gh distressing associated movements occur. Bunnell 27 performed a successful end to end suture of the l nerve by removing the intratympanic portion of nerve from its bed and shifting it anteriorly. ologous sensory or motor grafts have been used as es by which the axons gain access to the distal l trunk. End results in patients treated by these ods show no contractures, but there remain asso- d movements when strong volitional movements are pted. Function of the frontalis muscle is seldom ined.

CHODOFF, Langley Field, Va.
[ARCH. NEUROL. & PSYCHIAT.]

CH-HEARING TESTS. DOUGLAS MACFARLAN, Laryn- oscope **55**:71 (Feb.) 1945.

acfarlan reviews the past work on speech-hearing with the purpose of determining an accurate od of measuring the ability to hear the spoken . As Shambaugh Sr. and others have emphasized, not the hearing of the pure tones of the audiometer rather that of the spoken voice that counts.

e frequencies that occur in various spoken sounds important. In general, with a loss of ability to frequencies above 5,000 double vibrations, few con- nts are heard well, while vowels are heard poorly e is unable to hear the lower frequencies, par- rly those below 2,000 double vibrations. Vowels eard twice as easily as consonants. Some words ore easily heard than others, this being due chiefly e frequencies involved.

e reasons back of, and the difficulties encountered he preparation of suitable lists of tests sounds, s or sentences are discussed. One difficulty is the ence in dialects, in accents and in other aspects of h. On the whole, the one syllable numbers are ps the most intelligible. "Three" and "eight" are confused with each other. Oscillographic analysis ese two numbers, however, shows no similarity.

thods of making speech tests are discussed. One hear better by going from the audible to the in- le rather than the reverse. The patient should be med up," i. e., allowed to hear some clearly audible s before the test is begun. The examiner should d the lowest level at which all test words are heard ctly and also the level at which any word is inter- d correctly.

e author gives various sound, word and sentence that may be used in testing. He also shows par- r ways of testing small children. There are lists ords to show the ability to hear particular con- nt and vowel sounds. Also given are methods used sting the efficiency of hearing aids. There should be at least a 20 decibel gain when the aid is used. The otologist should be able to tell the patient what gain the aid is producing.

Several cases are cited to show that the hearing loss shown by the pure tone audiometer is not in the least like that shown by speech tests. Tests made with the phonograph audiometer are compared with those made with the pitch audiometer. There is a wide variation.

HITSCHLER, Philadelphia.

Nose

DOES SINUS INFECTION AFFECT SINUS GROWTH? HARRY C. ROSENBERGER, Laryngoscope **55**:62 (Feb.) 1945.

It is known that early infection of the temporal bone prevents its subsequent pneumatization. Some have reasoned that infection may influence the growth and pneumatization of the sinuses similarly. Rosenberger explains why this is not so unless it be in isolated cases. He investigated 163 cases and observed "much greater frequency of infection in the more symmetrical antrum as compared with the low incidence of infection in the more variable frontal [sinus]." Several case reports are included.

HITSCHLER, Philadelphia.

OCULAR COMPLICATIONS OF TUMORS OF THE NASOPHARYNX. B. J. TISCORNIA and I. LAMI, Arch. de oftal. de Buenos Aires **18**:557 (Nov.) 1943.

Little has been written on this subject in ophthalmologic literature, although the condition frequently produces initial ocular symptoms.

After the authors describe the intranasal and extranasal symptoms of the disorder, they mention the following ocular manifestations: muscular palsies, enophthalmos, neuralgias, ptosis, exophthalmos, edema and atrophy of the optic nerve, which, according to many observers, are common in the disease.

The anatomy of the nasopharynx and the surrounding region is described in detail, to show how involvement of the different nerve structures is responsible for the ocular manifestations. The extension to the external rectus muscle occurs early at times, and paralytic convergent squint is the result. The third nerve is usually invaded late in the disease, producing external or internal ophthalmoplegia. The optic nerve may be involved, and papilledema or atrophy may occur.

Involvement of the gasserian ganglion may result in severe neuralgia. Horner's syndrome may occur from involvement of the ciliospinal center or the cervical sympathetic outflow, and unilateral miosis, ptosis, ocular hypotony, exophthalmos and congestion of the skin of the side of the face may be noted.

Exophthalmos is frequent and is the result of invasion of the orbit by the tumor. Abnormality in the lacrimal secretion may be produced by involvement of the secretory branches of the facial nerve.

The most common tumors involving the nasopharynx are the epithelioma and the sarcoma. Observations in 8 clinical cases are given.

CARRASQUILLO, Utuado, P. R. [ARCH. OPHTH.]

Miscellaneous

RELATIONSHIP BETWEEN THE BACTERIOLOGY OF THE CONJUNCTIVA AND NASAL MUCOSA. C. BERENS and E. L. NILSON, Am. J. Ophth. **27**:747 (July) 1944.

Berens and Nilson found that 50 per cent of the 83 sets of cultures of material taken from the nasal and conjunctival membranes of 75 patients with extraocular diseases yielded organisms similar in type and toxicity from both the conjunctival and the corresponding nasal material; 43.3 per cent yielded "toxic" organisms from nasal secretions but no such organisms from the corresponding conjunctival material, and approximately 3.5 per cent yielded organisms of slightly greater toxicity from the eye than from the nose.

In determining the etiologic factors of chronic and recurrent extraocular inflammatory diseases, it is advisable to investigate the nasal mucosa as a possible source of infection.

REESE, Philadelphia. [ARCH. OPHTH.]

PURIFIED GELATIN SOLUTION AS A BLOOD PLASMA SUBSTITUTE. W. F. WENNER, Ann. Otol., Rhin. & Laryng. **53**:635 (Dec.) 1944.

The importance of making available a macromolecular substance which in aqueous solution would exhibit physicochemical properties similar to those of blood proteins was first recognized during World War I, and Wenner gives a rather comprehensive review of the work which has been done on the subject since. Gelatin solutions prepared in specially constructed plants under rigid physicochemical and bacteriologic control were found suitable for intravenous injection without evidence of producing sensitization and without histologic or clinical evidence of toxicity or irreversible accumulation. Such gelatin solutions have a definite effect in increasing circulating blood volume and cardiac output in dogs subjected to hemorrhage and in patients suffering from traumatic shock. Clinical evidence has shown that gelatin solutions exert a definite but temporary effect in relieving the state of shock, that these solutions therefore have a place in medical therapy to restore a loss of circulating blood plasma in acute injury of various types and that such gelatin solutions do not contribute significantly to nutrition.

M. V. MILLER, Philadelphia.

DIAGNOSIS OF MANDIBULAR JOINT NEURALGIA AND ITS PLACE IN GENERAL HEAD PAIN. JAMES B. COSTEN, Ann. Otol., Rhin. & Laryng. **53**:655 (Dec.) 1944.

Costen says that any regularly recurring pain associated with movement of the lower jaw allows the diagnosis of possible neuralgia of the mandibular joint until this condition is definitely ruled out. The anatomy of the attachment of the mandible to the skull provides obvious chances for impingement of the condyle on sensory nerve branches. Mesially the condyle may irritate the chorda tympani nerve as it passes out of the glenoid fossa through the petrotympanic fissure. Posteriorly it may involve the auricular branches of the auriculotemporal nerve within the temporomandibular articulation, and with a wider and looser movement it may involve the auriculotemporal nerve itself. When sufficient destruction of joint structures occurs to allow the eroded face of the condyle to rest against the tubercle of the glenoid fossa, an abundant source of reflex pain is produced. The symptom complex embraces some or all of the usual distribution of pain referable to the fifth nerve, and it belongs in the reflex, or secondary, group of neuralgias, in which mechan irritation of branches reflects pain to standard cr areas. The diagnosis of neuralgia of the mandib joint depends on the history, the gross findings, roentgen study and the test of treatment.

The author briefly reviews some of the literatur neuralgic pains and lists the significant findings i cases studied.

M. V. MILLER, Philadelph

TREATMENT OF INFLUENZAL MENINGITIS WITH SU DIAZINE. WALLACE SAKO, CHESTER A. STE and JOEL FLEET, J. Pediat. **25**:114 (Aug.) 194

Twenty-three children with influenzal meningitis been treated with sulfadiazine at the Charity Ho of Louisiana in New Orleans in the past two y Sixteen have been discharged as cured and have mained well except for 1 patient, who at the tim writing had residual generalized spasticity. Six ti ties occurred, all in infants under 8 months of age this age group only one recovery occurred, in an i 4 months old. Since sulfadiazine alone does not s sufficient in the treatment of these young infants, imperative that type-specific rabbit antiserum be gi together with large doses of sulfadiazine. Among infants and children the proportion of patients recover with sulfadiazine alone is very high.

Few spinal punctures and drainages were perfor

Leukopenia in 1 patient, hematuria in 1 patient drug fever in 1 patient were the only toxic condi encountered that can be attributed to the drug.

AUTHORS' SUMMARY. [AM. J. DIS. CHIL

THE EVALUATION OF COAGULATION TIME. R HARRIS, Laryngoscope **54**:677 (Dec.) 1944.

Harris felt that the coagulation time was of no v in determining whether or not there would be bleed during or following an operation. He consulted se prominent otolaryngologists, who agreed with Others thought it might be of value in a medicol way. Harris reviews 8,700 cases and finds the te no value in this series. He concludes that it is o value in a medicolegal way either. He suggests th be eliminated from the hospital routine.

HITSCHLER, Philadelph

A REVIEW OF TUBERCULOSIS. FRANK R. SPE Laryngoscope **55**:1 (Jan.) 1945.

Spencer reviews the recent literature on tubercu of the ear, the nose and the throat.

He mentions the case of tuberculosis of the si reported by Radner and Pinkerton and the cas tuberculosis of the pharynx reported by Szanto Hollender.

Cote believes that tuberculosis of the ear is r frequent, although often unrecognized.

Zobin presents an operative method for the reli pain in laryngeal tuberculosis. It is a major opera however, and not recommended because minor sur procedures, such as that of injecting alcohol into superior laryngeal nerve, will suffice.

Rothstein and Pirkle have discussed plastic sur for laryngeal stenosis occurring with the healing tuberculosis. The danger of tuberculosis beco active following surgical trauma must be consid

HITSCHLER, Philadelph

IATOLOGY. F. PAUL ANSBRO, New York State Med. **45**:397 (Feb. 15) 1945.

bro was chairman of the section on anesthesi- at the annual meeting of the Medical Society State of New York held in New York May 9, His source material was derived from the de- ent of anesthesiology of the Kings County Hos- nd the Long Island College Hospital. Concerning itation, Ansbro says that physicians seem to little about it in spite of the work of Flagg and who have tried to educate the profession in life . The three elementary principles are: 1. Insure y of the airways. 2. Supply oxygen to the lungs. supportive measures—heat, needle in the heart, lenburg position, and oxygen and helium. The atologist is an adequately trained physician skilled use of inhalational agencies and in laryngo- oscopy. He must know how much oxygen to hen and how to give it—in short, how to combat and anoxemia. "He literally stands at the oads of the medical sciences, an augury of good surgeon and the internist." In the discussion aluel J. Flagg said, "We [pneumatologists] are ly at home with the pathologic physiology inci- to this [unconscious] state, but we know how uce, direct and safeguard unconsciousness." This electric shock, submersion, high altitude flying, al warfare or carbon monoxide poisoning—"a ty calling for the best that medicine has to give."

VOORHEES, New York.

ALIES OF THE SPEECH MECHANISM AND ASSO- TED VOICE AND SPEECH DISORDERS. JAMES SON- TT GREENE, New York State J. Med. **45**:605 arch 15) 1945.

ene, who is director of the National Hospital for Disorders at 61 Irving Place, New York, his paper at the annual meeting of the Medical y of the State of New York March 9, 1944. He that anomalies of the mouth and the larynx both voice and speech adversely and thus handi- e patient in his social and business life. Abnor- s of the tongue, tongue-tie and even elinguation, ry to popular opinion, do not seriously affect . Clefts of the palate, on the other hand, do ly affect speech even when repaired or treated by means of a fitted obturator. In either case subsequent training of speech is imperative. Tension on the muscles supplying the soft palate holds the nasopharynx open, and the voice is, therefore, of the rain barrel variety. After laryngectomy the voice may be produced by use of an artificial larynx or by training cervical muscles to produce the esophageal voice, i. e., by regurgitating swallowed air. It is possible through patient training to produce a voice that can be heard and understood in a room at conversational distance (4 to 6 feet [1 to 2.5 meters]) or over the telephone. It is preferable to develop a "substitute voice" rather than to depend on an artificial larynx, which up to now is a very imperfect affair.

VOORHEES, New York.

ROENTGENOGRAPHIC DIAGNOSIS AND TREATMENT OF HYPERTROPHY OF THE THYMUS. R. GRONDIN, Union méd. du Canada **72**:904 (Aug.) 1943.

Grondin draws attention to the difficulties of making the diagnosis of hypertrophied thymus from roentgenograms. He stresses the importance of taking the pictures with the child in the upright position and placed at a right angle to the rays. The image is more nearly perfect at the end of expiration, but not with forced expiration, such as crying.

DAFFINEE, Melrose, Mass. [AM. J. DIS. CHILD.]

SHORT ESOPHAGUS IN INFANTS. M. LELONG, P. AIME and A. AUBIN, Presse méd. **49**:106 (Jan. 28) 1941.

Short esophagus is to be distinguished from diaphragmatic hernia, esophageal diverticulosis or ulceration and bilocular stomach. An infant (particularly a first-born male child) who vomits or regurgitates immediately after feedings and who vomits bloody mucus should be carefully studied fluoroscopically. Swallowing of an opaque substance reveals the short esophagus with the cardia above the diaphragm. (With diaphragmatic hernia the cardia is below the diaphragm or lies above a redoubled esophagus.) Treatment consists of thickening the formula and maintaining the vertical position during and immediately after feeding. The prognosis is not bad unless malnutrition or complications, such as spasm, ulceration or esophagitis, supervene.

DAFFINEE, Melrose, Mass. [AM. J. DIS. CHILD.]

Society Transactions

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY

Regular Monthly Meeting, Feb. 5, 1945

ELMER W. HAGENS, M.D., *President*

WALTER H. THEOBALD, *Secretary*

Clinical Significance of Hoarseness. Presented by DR. LOUIS H. CLERF.

Hoarseness, a symptom, is the result of interference with the normal phonatory function of the larynx. While changes in the voice may result from nasal obstruction, development of a pharyngeal tumor, enlargement of tonsils, presence of adenoids and other pathologic conditions, they should not be designated as hoarseness. It is also important to bear in mind that correction of such conditions will not correct voice changes due to laryngeal dysfunction. Normal phonation requires approximation, tension and vibration of the vocal cords. Any lesion which interferes with one or more of these will produce the symptom hoarseness.

While phonation is necessary to enable one to ascertain whether hoarseness is present, the cause can be determined only by adequate examinations which include the larynx. Since many diseases of the larynx are local manifestations of systemic or environmental conditions, and others, parts of systemic diseases, the need for careful study is apparent.

Examination of the upper air and food passages should be considered as a routine part of the physical examination. It includes palpation of the neck. Mirror laryngoscopy, a procedure which should be practiced by all who treat patients suffering with hoarseness, is important and usually gives more information than does direct laryngoscopy. Failure to secure a satisfactory view of the larynx may be due to one of many causes. Among these are lack of experience on the part of the examiner, inadequacy of the instrumentarium, lack of cooperation on the part of the patient, improper position and certain anatomic conformations, notably an overhanging epiglottis. The patient who smokes chronically is a difficult subject for examination, and it may be necessary to employ a local anesthetic. In the examination of the upper respiratory and esophageal passages, one can determine the need for roentgen studies of the chest and neck, serologic studies and other systemic examinations.

Since a majority of laryngeal lesions producing hoarseness, excluding acute and chronic laryngitis, involve the anterior half of a vocal cord, it is imperative that the anterior commissure be examined before arriving at final conclusions. The most common group of lesions met with in my experience are the small, discrete, sessile or pedunculated elevations, which are usually unilateral, occur at the junction of the middle and anterior thirds and are variously described as fibroma, fibroangioma, vocal nodule, polyp and angioma. Practically all of these have a common origin, namely, improper or excessive use or abuse of the larynx. As a rule, there is little difficulty in diagnosis. While satisfactory results can be secured by vocal rest in cases of small nodules of the vocal cord, in a majority of cases it is necessary to remove the tumor mas insure that the patient remains at rest vocally f adequate period. It has been my practice to all the patients discontinue smoking for a pro period.

In cases of chronic hyperplastic laryngitis the cl often resemble an enormous sessile polyp involvi entire length of the membranous cord, and such present similar problems in therapy. The best r are secured by removing all the redundant tiss a stripping method and insuring that the patien tinues at rest vocally for a sufficient time.

Contact ulcer is an extremely perplexing les treat. While the diagnosis usually is not difficult ticularly if the ulcer is bilateral, in the case in it is unilateral one must think of carcinoma, sy and tuberculosis. I have a number of patients this lesion who are definitely allergic and hav responded well to treatment. Scalping off the exc granulation tissue and ulcer usually is not follow healing. Perichondritis of the vocal process o arytenoid probably is responsible for the long persi of symptoms in some of the patients. There appa are other factors, notably emotional, which are tributory. As a rule one does not wish to do lar fissure to approach the vocal process, and unless is familiar with suspension laryngoscopy it is di to be certain that all the necrotic cartilage has removed.

While the causes of paralysis of a recurrent are numerous, the common causes are an injury o nerve, usually surgical, a neoplasm of the thyroid g the esophagus, the trachea or the upper mediast and undiagnosable causes, cases with the latter stituting from 15 to 20 per cent of all cases. T appears to be considerable confusion, particularly a surgeons, concerning the effects of unilateral par of a vocal cord. It is not unusual to find unila paralysis following thyroidectomy, with a normal so far as phonation is concerned. It is only whe patient attempts to sing that disturbances are n While one should distinguish between ankylosis o cricoarytenoid joint and paralysis, the diagnosi paralysis is simple. It is more difficult, however determine the cause of paralysis. I have obse cases of unilateral paralysis with loss of tension on on during so-called grip, the disturbance ultim clearing up spontaneously.

In bilateral paralysis of traumatic origin, the deformity is adduction of both cords with marked croachment on the glottic chink, producing dy but only slight disturbance of voice. It is unsa defer tracheotomy if the patient has dyspnea or choking attacks while swallowing. Before con plating some surgical procedure to increase the of the glottis, it is well to wait three or four mo as unilateral recovery has occurred in a certain pro tion of cases. If, however, after a reasonable t there is no recurrence of function, then either moti tion with lateral fixation of an arytenoid or arytenoi tomy is indicated. The results of these operations uniformly good.

Among benign neoplasms, recurrent papilloma the most common and undoubtedly the most tro

When it occurs in an adult, one must be on lert, for cancer occasionally develops. Whether s a distinct independent process cannot be deter-

children tracheotomy should be done if there is ea, since the papilloma usually recurs rapidly, ith a small glottic chink delay is hazardous. In tracheotomy is not commonly required.

ny plans of therapy have been advocated, but in xperience none gives consistently good results. genic substances have been given a trial without, y opinion, any remarkable benefit. I therefore till removing papilloma with noncutting forceps hope and expectation that it will ultimately cease ur and that there will be left behind a normal x. Good results by diathermy have been re- l. Care must be taken in its use to prevent anent injury to the larynx.

e most important and most interesting disease of rynx is carcinoma. There are some who believe ecancerous lesions. If there are precancerous s, probably hyperkeratosis of the larynx would rm, for it exhibits extensive proliferation of sur- pithelium without, however, any tendency toward ation. A large number of cases of hyperkeratosis ow being seen. The cause is not apparent. In cases the lesion is localized, appearing as a well nscribed area on the surface of one or both cords, y anteriorly. In another group the keratosis is sive, involving the edge and upper surface of both cords, even extending subglottically. There com- is a history of excessive smoking, but abstinence smoking even for long periods seems to exert beneficial effect. It is possible that there may be d deficiency, although correction of any such ency usually has not been followed by improvement. patients should be kept under close observation, a certain number carcinoma does occur, whether part of the keratosis or not. In others, removal e keratotic material with cupped forceps often s in complete recovery.

rcinoma of the larynx seems to be on the increase. all the propaganda that is being advanced on the ct of cancer, I question whether the diagnosis is any earlier now than it was two decades ago. There till many patients who when seen have advanced r who were treated over long periods for chronic eness or chronic laryngitis. As with the diagnosis ncer elsewhere, it is necessary to think of cancer possibility and also to look for it. Because of the s nature of the disease it is imperative that ade- studies be carried out in every case in which geal disease is suspected of being cancer. This les biopsy. No harm can result from taking a men for biopsy if it is properly taken. It is of important in this connection to emphasize eed of performing biopsy carfully, for a negative of biopsy has never ruled out cancer in the patient. erely signifies that the specimen submitted con- no cancer. If the clinical diagnosis suggests r and the biopsy does not confirm it, the obvious is to repeat the biopsy until one is satisfied that patient either has or does not have cancer. In of all the advances that have been made in cancer rch and in the use of radiation, we have not pro- ed far in the field of therapy.

is important that in discussing therapy one should consider surgical treatment versus irradiation or plans of treatment, but surgical removal, irradia- and other plans of treatment versus carcinoma. must, however, evaluate the various plans of therapy on the basis of effectiveness and, when so doing, one must be scientifically honest. Statistics can be distorted to prove or disprove anything. In evaluating end results of methods of treating carcinoma, the diagnoses must be based on microscopic study of the tumors, not on clinical observations. One should have the opinion of a competent laryngologist. I am not willing to accept the opinion of the radiologist who has turned laryngologist in order to evaluate the results secured by his own plan of therapy. I should not wish him to accept my opinion as to dosage, filtration or other technical requirements of radiation therapy.

On the basis of observations made on patients treated by irradiation, I still believe that surgical treatment offers infinitely more to the patient with laryngeal cancer. In patients with the small, well localized lesion involving a vocal cord at the junction of the middle and anterior thirds without subglottic extension or involvement of the anterior commissure, laryngofissure will give as high as 90 to 95 per cent nonrecurrence in five years. In my series of patients treated by laryngofissure, now more than 150, including many with subglottic growths, with lesions involving the anterior commissure and with lesions in which the tip of the vocal process was involved, I have been able to secure a nonrecurrence rate of 79 per cent after five years. In the laryngectomized group one must of course consider the patients in whom the growth still is confined to the larynx, and these must be further subdivided into those with a lesion of the vocal cord, those with a subglottic lesion and those with an epiglottic lesion. The subglottic lesion gives the worst prognosis. In patients with extrinsic cancer or in those in whom there is metastasis one can hope for little, but I still believe that my group with five year nonrecurrence following laryngectomy and block dissection of the neck, followed by irradiation, shows a better result than the group in whom irradiation only has been carried out.

DISCUSSION

DR. DANELY P. SLAUGHTER: The part of Dr. Clerf's paper which I am qualified to discuss is that on cancer of the larynx. I should like to emphasize with him that biopsy is the only positive way to make a diagnosis, and it should be done in all suspicious cases. Unfortunately, even specialists sometimes treat these patients for other conditions on the basis of clinical diagnoses. In a large charity clinic, my associates and I see too many patients with late cancer of the larynx who have been treated for a long time on the basis of a clinical diagnosis of some other lesion, and by the time biopsy is done the diagnosis may be established too late. The pathologist is not infallible, but his diagnosis is certainly better than a clinical impression, and it is worth while to repeat biopsy several times if there is any doubt about the presence of cancer, because cancer is 100 per cent fatal if not treated.

As to the treatment of patients with laryngeal cancer, physicians are still in a state of indecision. Laryngofissure and laryngectomy will cure any cancer of the larynx that radiation will cure, and many that radiation will not cure. There is no one perfect technic as yet, but the percentage of cures reported for radiology is low enough in comparison with that reported for surgery that there would seem to be no question as to which is preferable. On the other hand, there is no question that radiation methods will cure a certain percentage of patients. The problem always comes up of what one should advise the patient—whether one should tell him that there are two methods of treat-

ment, surgical removal of the larynx and irradiation of the larynx. I do not know. I think it is up to the laryngologist to make the decision for him. No one likes to remove the larynx and leave the patient without a voice, but when one sees the results of irradiation one feels that one is justified in advising surgical removal in the majority of instances. Those who have seen results from both irradiation and surgical treatment have a much better idea of the difficulties experienced by the patient treated with radiation. It seems to me that radiologists tend to minimize these problems and do not report the radionecrosis, the death from aspiration pneumonia, the acute edema and the recurrence, but those who work in a tumor clinic see these conditions day in and day out.

Several methods have been described by which one can select the cancer which will be curable by radiation. The pathologists say that the more highly undifferentiated lesion is most sensitive. The radiologists say that the early lesion confined to one cord in which there is still mobility is radiocurable. So far as I know, there is no one yet who can look at a given cancer and say whether or not it is curable by radiation. Of course, no one can say that the same cancer is curable by surgical methods from the standpoint of lateral metastases in the neck, but at least with surgical removal there is no larynx for the tumor to recur in.

As to statistics of end results, three year nonrecurrences are not valid. I do not think any one accepts figures based on these as being of serious importance so far as cure of the cancers is concerned. Five years is the minimum, and it is beginning to be realized that this should be extended to ten to fifteen years. I agree with Dr. Clerf that statistics are tricky; nevertheless, in analyzing a large series of cases, statistical analysis is the only way one can arrive at an evaluation. I know of no one who has alternated treatments on patients in a large series, without selection, taking them as they come and treating every other one by surgical operation or irradiation. I think laryngologists might produce more complete information if this were done. At one of the large hospitals for patients with cancer in New York, they have practically given up irradiation of operable laryngeal cancer; they have had so many failures, so many difficulties, that they advise patients to choose laryngectomy.

Dr. Clerf's results with laryngofissure are remarkable. When the indications for this operation are confined within strict limits, it certainly is the treatment of choice. I think it has fallen into disrepute in some quarters because laryngologists have tried to make it do too much. As to lateral metastases in the neck, they are for all practical purposes incurable by radiation. Squamous carcinoma in cervical nodes from any source should not be a concern of the radiologist. When the nodes are operable, radical dissection of the neck is the treatment of choice and will give a fairly good five year cure rate. I do not think one should consider the presence of early metastates in cervical nodes as a contraindication for surgical intervention in a new patient. In considering a new patient, if the primary lesion is operable, there is no reason that laryngectomy cannot be combined with radical dissection, or dissection of the neck done soon after the larynx has been removed, and this has been done in several cases. If the lesion crosses the midline, the patient may have bilateral metastases in the neck. I think in this case bilateral dissection of the neck should be done if the metastases in the nodes are operable, as the disease is always fatal and one is justified in going to considerable length to obliterate it.

DR. PAUL HOLINGER: The members are to be congratulated on having Dr. Clerf give them this outstanding presentation. One has a peculiar disposition to either deny or defend, depending on how one looks at his remarks, and I think discussion gives one the opportunity to do one or the other. First, I should like to ask about the treatment of chronic laryngitis. one sees patients with chronic laryngitis which persists and remains simple chronic laryngitis after tuberculosis, syphilis and cancer have been eliminated by all significant tests. Too often, of course, chronic laryngitis is in reality carcinoma, but one still sees a few patients with true chronic laryngitis.

Another problem Dr. Clerf mentioned is that of hyperkeratosis and leukoplakia; they are not the same. I wish he would say more of treatment other than scraping the tissue. When does the lesion turn into cancer and when does he resort to laryngofissure or laryngectomy? This question is prompted by observation of a patient with such a proliferation of tissue that laryngofissure became necessary since it was impossible to remove the tissue adequately by endoscopic means. Deep within the cord the histologic examination demonstrated the presence of low grade carcinoma.

On the question of surgical removal versus irradiation for treatment of carcinoma of the larynx, I agree fully with Dr. Clerf and Dr. Slaughter that treatment should be evaluated on the basis of the patient with his cancer, not on the basis of one type of treatment versus another. But with irradiation being so blatantly expounded in the lay press as superior to surgical removal, even to the point of eliminating surgical treatment because of the supposedly better functional results with irradiation, one must reanalyze some of the facts of surgical treatment versus those of irradiation in the light of recent experience.

Accuracy of diagnosis is the first point. I know of no laryngofissure or laryngectomy done without a biopsy demonstrating cancer. Yet at Research and Educational Hospitals we have had 2 patients on Dr. Lederer's service who died of tuberculosis following treatment by a famous tumor group for supposed carcinoma of the larynx. No biopsy had been made. I believe Dr. Galloway has had a similar experience at Cook County Hospital. In another instance, that of a patient referred to St. Luke's Hospital for biopsy by his nephew, a physician, irradiation had been started by the same group for a supposedly obvious laryngeal carcinoma without a biopsy having been made. Biopsy proved the tumor to be a papilloma. Certainly, if based on statistics drawn from series including such cases, the cure rate for irradiation would be high.

Another point of importance is that if a patient who has had irradiation for an operable cancer of the larynx should have a recurrence, it is difficult to know the extent of the recurring lesion. One can see the previous recurrence locally; it would be easy to say it should then be removed surgically since it failed to respond to irradiation. But in removing what appears to be the tumor one finds it has extended much farther than was anticipated by its gross appearance, once the appearance has been changed by radiation therapy. Finally, if, as both Dr. Clerf and Dr. Slaughter state, the curability of cancer is so much greater in both early and medium lesions if these are dealt with by surgical means rather than by radiation, by all means let us fight this ability of radiology to take patients away from surgery through erroneous data.

Again let me take this opportunity to thank Dr. Clerf for coming to Chicago to give this splendid

discussion. And let me congratulate him on ellence of his movies.

L. B. BERNHEIMER: I have seen a number of s with carcinoma of the larynx treated by irradi- The diagnosis of carcinoma was made only xamination of biopsy specimens, and the indica- or irradiation were controlled by the following : 1. Noninfiltrating neoplasms with freely e laryngeal structures are good tumors for ir- on. 2. Highly anaplastic lesions are sometimes ally inoperable and are then to be irradiated ough fixation is present. 3. Patients with post- ve recurrent laryngeal carcinoma are treated oentgen rays, but the end results are usually . Patients with carcinoma of the larynx who ome systemic contraindication to surgical inter- are treated by irradiation.

end results in the early noninfiltrating lesions ted were excellent, and I believe they will be to compare favorably with the results obtained yngofissure. If an opinion is sought regarding ative merits of irradiation and surgical proce- it is through treatment of such early lesions ch an opinion must be formed. Extensive infil- neoplasms with cervical metastases do not re- to irradiation, and the honest radiologist will state that he cannot cure such lesions but can nly palliative treatment. He will also frankly at any lesion that shows evidence of infiltration spond much better to surgical removal than it irradiation.

therapeutic test is not a test to see whether oplasm disappears, but whether motility may ored in a fixed lesion by exposure to a relatively mount of roentgen radiation. If motility is re- the interpretation is that the fixation is due to nation and not to neoplasm and that therefore ion is noninfiltrating and favorable for irradia-

ve performed laryngectomy on a number of pa- who, in spite of adequate irradiation, showed nt or recurrent disease. The dissection of such s was more difficult because of increased bleed- d scar formation, and healing was delayed. The rative use of penicillin, however, has been ex- helpful in the healing of such wounds.

my opinion that there is a definite place for irradiation in the treatment of carcinoma of the Surgical procedures can do many things that on therapy cannot do, as well as everything that on therapy can do, but there is room for both treatment of this disease. The indications for tion are definite, and if these indications are d by adequate roentgen therapy, good results obtained.

THOMAS C. GALLOWAY: We have gone through phases in the treatment of cancer of the larynx k County Hospital. There was a time when we t every tumor should be operated on; then there time when we swung rather strongly to irradia- nd we used it in some rather early intrinsic s. I have come back to the point where I think ration offers any particular hope it should be except when it is contraindicated by the patient's l condition. What I tell patients is now that st figures on irradiation, reported by Coutard in ndicate that about 28 per cent of the patients d a five year arrest but that afterward he had ort that about one third of those with arrested got recurrences of growth in the sixth and seventh years. I tell patients that Clerf and Jackson and others, by operation in suitable cases, get cures in 80 to 90 per cent and that the patients are left with a normal airway and a usable voice. I tell them also that no one is justified in making them believe that irradiation is without discomfort or danger or that it can give them a nearly 100 per cent chance of cure. Cook County Hospital is the final repository of failures, and there I have seen 3 patients die within six months of the time they had been presented in a certain clinic as cured. It seems to me there has been some harmful exploitation of the claims for irradiation in treatment of tumor of the larynx, although I give it great credit in treatment of many other tumors about the head. It is true that the radiotherapeutist cannot do much for patients with advanced cancers.

DR. LOUIS H. CLERF: I am grateful to the discussers for their consideration. I did not go into the subject of chronic laryngitis because of lack of time. It is an important entity and often is extremely difficult to treat. The history of these patients is important. A careful study of the patient's habits, working conditions, home environment, dietetic, drinking and smoking habits and basal metabolic rate, among other investigations, will often give a clue concerning the causes as well as the treatment. I recall the case of a man whose work required him to go into a "cold room" many times. This sudden change in temperature from a warm to a cold atmosphere proved to be the cause, for when his work was changed the laryngitis cleared up. In another patient infection of the upper food passages was unquestionably a factor, for following tonsillectomy his laryngitis cleared up promptly.

The treatment of keratosis is difficult. For the localized lesion, removal with cupped forceps may be all that is required. The removal of the diffusely distributed lesion presents a problem. It is imperative, however, that patients with keratotic lesions be kept under observation, for in a certain proportion of them carcinoma develops.

Dr. Bernheimer spoke of grading tumors. The group with which I am associated have discontinued this because the pathologist does not believe it is of any particular value, and in our experience recurrences have not been dependent on the degree of malignancy of the tumor, at least so far as we could determine. Too often, moreover, sections made from different portions of the same tumor do not exhibit the same degree of malignancy. Further, pathologists vary remarkably in their interpretation of degrees of malignancy.

Cordal tumors are commonly of grades 2 or 3, with a few of grade 1. Tumors of the ventricular band and of the arytenoid, also pharyngeal tumors, are often anaplastic.

Irrigation of the Maxillary Sinus by Way of the Middle Meatus. Presented by DR. O. E. VAN ALYEA.

For purposes of irrigation the middle meatal approach to the maxillary sinus is rapidly gaining favor as more and more rhinologists become acquainted with the advantages of this route over that of the inferior meatus.

It has been estimated by anatomic study that the maxillary or an accessory ostium is readily available for cannulation in 55 per cent of persons, while in 30 per cent it may be reached, but with difficulty, and in the remaining 15 per cent it is entirely inaccessible.

Prolonged search for an elusive opening is not advised, because excessive manipulation near the ostium is harmful. If the opening is not reached readily, punc-

ture of the wall is advocated. The common site for the perforation is in the vault of the inferior meatus but an improvement over this location is found in the membranous area of the middle meatus. Puncture of this area is devoid of many of the annoying features associated with puncture of the bony inferior meatal wall.

Objections raised against use of this area are the danger of mishaps, such as air embolism, penetration of the orbit or the ethmoid area and the possibility of disturbing the mucociliary stream by placing a new opening near the ostium.

These criticisms are more than offset by those associated with the inferior meatal route. The technic making use of the latter has resulted in far more mishaps than have occurred from perforation of the membranous area, and if the middle meatal puncture procedure is properly carried out, there is little danger of complications or of serious damage to the mucosa.

The preferred site for puncture is low in the middle meatus just above the inferior turbinate near the junction of its middle and posterior thirds.

DISCUSSION

Dr. Robert Fraser: I enjoyed this presentation and am grateful to Dr. Van Alyea, just as I have been for progress gained through his earlier work. Certainly his specimens are excellent and most illustrative. In the smaller city one is required to irrigate the maxillary sinus in a higher percentage of cases of infection of the upper respiratory tract. The patient is perhaps seen earlier and more frequently, and he reviles one more roundly for each day of prolonged pain or disability from a suppurative maxillary sinus. Further, the anesthesia used for the procedure had better be effective.

This paper of Dr. Van Alyea's has the purpose of making the middle meatus routine more rational and familiar. I should like to mention some minor points in anesthesia, instrumentation and recording. Dr. Edward King showed me his Wocher-made cannula in 1924. His children's size, valuable for use in adults, is similar to Dr. Van Alyea's no. 1, but more slender; the opening is farther from the tip, and it is very stiff in consideration of its diameter. One may feel sure of penetration, and the return flow is more ample than with larger instruments. I give the patient 30 mg. of sodium pentobarbital and apply 10 to 15 mg. of cocaine paste (e. g., 10 mg. of cocaine hydrochloride, in the form of flaky crystals, mixed with 0.0033 cc. of 1 per cent aqueous solution of ephedrine sulfate) on a slender S-shaped copper applicator 10 cm. in length. This is made by tapering a no. 12 copper wire by dipping in nitric acid and is kept from falling by a 3 mm. strip of adhesive tape attached to the opposite malar area; it inserts in a moment.

For the local topography on the lateral wall posterior to the unciform bone, the point of entry may be recorded as FPT (first point touched) or as one of nine possible positions, namely, 1, 2, 3 (backward) and high, medium, low. This becomes a great help in probing for the same place again.

Should a polyp or turgidity obstruct, oil is injected first, which promotes return flow and safety. One feels justified in irrigating early enough and often enough to get ahead of granular disintegration and digestion of the exudate.

Dr. Alfred Lewy: So far as I can remember, in Chicago the maxillary sinus was first washed out through the natural ostium by Norval Pierce, whom several of my colleagues and I, then young, learned the technic. I have been doing it ever with, I believe, excellent results and few mish think Dr. Van Alyea's description of his tec about as good as any one can make it, but it m learned by doing it. It is best done by touch, a is difficult to explain. I cocainize the middle with a 5 per cent solution of cocaine hydroc without any preparatory treatment. If I fail the natural opening, I use Ruskin's curved needle duced with the point down, and when I think I enough back to be in contact with the membr portion I turn the point downward and outwa made my first essay with Dr. Van Alyea's c but the patient got a pain in the eye and I desis have also had the experience of finding that the ment had entered the orbit when I was mak entrance in the sinus with a dull cannula. I shorter instrument for use in children, and I th well to use that if there is trouble in pushing a turbinate bone. Anatomists consider that in only 20 to 25 per cent of persons is the natural o available. However, they are dealing with tissues rigid by preservatives. Clinically, I should say available in 80 to 85 per cent. In the living p the turbinates are more or less flexible. I think a mistake to irrigate an antrum more than once a if the involvement is subacute.

Dr. Thomas C. Galloway: I should like t Dr. Van Alyea whether he uses the Yankauer cannula, and how frequently he irrigates the sinu

Dr. O. E. Van Alyea: I recall that when I the first paper on this subject, in 1936, Dr. Gal asked whether I used the Yankauer, and the a was "No" then and still is. I think that wh instrument one is accustomed to or prefers is th to stick to. Goodyear uses one similar to the c which I use for the frontal sinus; it is a little th He says it must be that shape and size. The c use I like, and if I did not I would change the think the sharp-pointed instrument should be tha that will not cause a wide break, which may res a permanent opening.

I have definite ideas as to the frequency of irriga I feel that overirrigation is a tremendous mi Infections can be kept going by irrigating the too often, and one may not know this until the pa is not available for irrigation, and seems to be l when one does see him again; then one realizes one has been overdoing it. One should not de solely on irrigation, especially in cases of chroni ease which one is trying to clear up without res surgery. Something should be done in additio removing the exudate. An effort should be ma find what is keeping the sinus in that state in c that the cause of infection may be removed as w drainage established. This may require a thor study on a systemic basis, including an allergic su it may also require an occasional roentgenologic ch up with iodized oil instilled in the cavities. Many are not hopeless if one has enough persistence enough cooperation from the patient to make a study.

Penicillin is effective in cases of chronic infec according to Crowe. I have not used it sufficient say whether it is of any benefit when applied lo in the sinuses.

Book Reviews

rs at War. Edited by Morris Fishbein, M.D., or of the Journal of the American Medical Asso- ion, chief editor of War Medicine and chairman he Committee on Information of the Division of dical Sciences of the National Research Council. ce $5. Pp. 418, illustrated with photographs and rts. New York: E. P. Dutton & Co., Inc., 5.

book reveals the inspiring story of American s in action in World War II. The text is well and well indexed.

literary ability and grammatical purity of the require no further comment—they are well known of us. His arrangement of subjects and his of contributors make this book one of the most le documents of this greatest of all wars.

s true that other books will be published from time setting forth further details and researches, t always must take place; but this one covers the ield so completely and comprehensively that it emain a valuable document.

ddition to Dr. Fishbein, the following distin- d physicians contributed to the documentation: e B. Darling, M.D., vice chairman of the Division dical Sciences, National Research Council; Harold hl, M.D., member of the Directing Board of the rement and Assignment Service and dean of the rsity of Minnesota School of Medicine; Major al David N. W. Grant, Air Surgeon; Charles M. h, M.D., Medical Director, Veterans Administra- Major General Norman T. Kirk, Surgeon Gen- United States Army; Major General Paul R. y, Chief Surgeon, European Theater of Opera- Major General George F. Lull, Deputy Surgeon al; Vice Admiral Ross T. McIntire, Surgeon al, United States Navy; Captain French R. , Medical Corps, United States Navy; Thomas Parran, M.D., Surgeon General, United States Public Health Service; Brigadier General Fred W. Rankin, Chief Consulting Surgeon, United States Army; G. Canby Robinson, M.D., LL.D., Sc.D., National Director of the Red Cross Blood Donor Service; Colonel Leonard G. Rowntree, Chief of the Medical Division, Selective Service System; Colonel Howard A. Rusk, Chief of the Convalescent Training Division, Army Air Forces; Brigadier General James Stevens Simmons, M.D., Ph.D., D.P.H., Sc.D.(Hon.), Chief of Preventive Medicine, United States Army.

The contributors should be congratulated for presenting so much factual material, and their documentation is crystal clear and lucid despite the wartime stresses to which they have been subjected. It only proves again how much these men are really worth.

This book has been "Dedicated to the ONE HUNDRED AND EIGHTY-SIX THOUSAND PHYSICIANS OF OUR COUNTRY who, in the armed forces, in industry and in civilian life, maintained us in health during the war years."

Physicians will enjoy reading "Doctors at War," for it is the application of American medicine to a global conflict with infinite problems under varied conditions.

News and Comment

AMERICAN BOARD OF OTOLARYNGOLOGY

The meeting of the American Board of Otolaryngology which was scheduled to be held in October 1945 has been canceled. It is at present proposed to hold an examination in the spring, the exact date and place of which will be announced later.

Directory of Otolaryngologic Societies *

NATIONAL

All meetings have been canceled.

American Medical Association, Scientific Assembly, Section on Laryngology, Otology and Rhinology

Chairman: Dr. Louis H. Clerf, 1530 Locust St., Philadelphia.

Secretary: Dr. Fletcher D. Woodward, 104 E. Market St., Charlottesville, Va.

American Academy of Ophthalmology and Otolaryngology

President: Dr. Gordon B. New, Mayo Clinic, Rochester, Minn.

President-Elect: Dr. Alan C. Woods, Johns Hopkins Hospital, Baltimore 5.

Executive Secretary-Treasurer: Dr. William L. Benedict, 100–1st Ave. Bldg., Rochester, Minn.

American Broncho-Esophagological Association

President: Dr. Carlos E. Pitkin, Carnegie Medical Bldg., Cleveland.

Secretary: Dr. Paul Holinger, 700 N. Michigan Ave., Chicago 11.

American Laryngological Association

President: Dr. Harold I. Lillie, Mayo Clinic, Rochester, Minn.

Secretary: Dr. Arthur W. Proetz, Beaumont Bldg., St. Louis.

* Secretaries of societies are requested to furnish the information necessary to keep this list up to date.

American Laryngological, Rhinological and Otological Society, Inc.

President: Dr. Albert C. Furstenberg, University Hospital, Ann Arbor, Mich.

Secretary: Dr. C. Stewart Nash, 708 Medical Bldg., Rochester 7, N. Y.

SECTIONS:

Eastern.—Chairman: Dr. Oram R. Kline, 414 [illegible] St., Camden, N. J.

Southern.—Chairman: Dr. Verling K. Hart, [illegible] 7th St., Charlotte, N. C.

Middle.—Chairman: Dr. Carl H. McCasky, 608 [illegible] anty Bldg., Indianapolis.

Western.—Chairman: Dr. Aubrey G. Rawlins, 38[illegible] St., San Francisco.

American Otological Society

President: Dr. Gordon Berry, 36 Pleasant St., W[illegible] ter, Mass.

Secretary: Dr. Isidore Friesner, 101 E. 73d St., York.

American Otorhinologic Society for the Advancement of Plastic and Reconstructive Surgery, Inc.

President: Dr. Morris S. Bender, 121 E. 60th St., York.

Secretary: Dr. Jacob Daley, 104 E. 40th St., York 16.

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